4.18 WATER QUALITY AND SEDIMENTS

This section presents baseline conditions in the proposed Project area and discusses potential impacts and mitigation related to construction and operation of the Project. It also evaluates impacts of alternatives to the Project. Comments received during public scoping and review of the Draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR) and the March 2006 Revised Draft EIR are also addressed in this section. Representative 2004 comments included impacts on water quality from spills; erosion; and discharge of ballast waters, sewage, cleaning and washdown waters, and other wastes. Representative 2006 comments addressed U.S. Environmental Protection Agency (USEPA) National Pollutant Discharge Elimination System (NPDES) discharge quantities; estimated rain volume; the adequacy of the Drilling Fluid Release Monitoring Plan; regulatory compliance by the Applicant; gray water and black water treatment and discharges; release of contaminants associated with construction to water bodies; applicability of the Clean Water Act § 316(b); and water quality degradation due to Project support vessels. This section does not discuss international ramifications of Project activities on water quality and sediments (such as ballast discharge in foreign ports) because any overseas activities would be within the jurisdiction of other countries.

4.18.1 Environmental Setting

This section describes the marine water, groundwater, and surface water resources in the Project area. It includes the characteristics of the sediment in the Project area because water quality is affected by sediment chemistry.

The Project involves the installation and operation of a floating storage and regasification unit (FSRU) approximately 12.01 nautical miles (NM) (13.83 miles or 22.25 kilometers [km]) offshore of Ventura County, two 24-inch (0.6 meter [m]) diameter pipelines from the FSRU to shore and the metering station at the Reliant Energy Ormond Beach Generating Station, and two onshore pipelines in Oxnard and Santa Clarita. The offshore pipelines would be installed beneath Ormond Beach using horizontal directional boring (HDB). The FSRU would convert natural gas from its liquid to gaseous form and would operate for 40 years. Construction and installation activities have the potential to release contaminants to surface water, and the FSRU would have several discharges to the ocean during its operation, including ballast water, treated sewage, storm and washdown water, cooling water, and fire suppression system testing water. Also, the FSRU’s hull would be coated with anti-fouling material.

Offshore

4.18.1.1 Marine Water

Water quality of the ocean waters within the Southern California Bight and the Project area, specifically temperature, salinity, dissolved oxygen, pH, transparency, trace metals, and waterborne bacteria, is presented in Table 4.18-1.

Table 4.18-1 Major Water Quality Parameters of the Ocean Waters in the Project Vicinity

Temperature	• Surface water temperatures at Port Hueneme (Entrix 2004a) exhibit a cyclical pattern, with the lowest mean temperature (55.8° Fahrenheit [°F] [13.2° Celsius (°C)]) occurring during February and March and the highest mean temperature (62.2°F [16.8°C]) occurring during August (Entrix 2004a). Surface water temperature data collected offshore of the Reliant Energy, Inc. (Reliant) Ormond Beach Generating Station are consistent with the Port Hueneme data (Entrix 2004a). • During warmer months, the temperature difference between water at the surface and water at a depth of 200 feet (61 m) may be 15°F (8.3°C) to 20°F (11°C); this difference can be as small as 1° F (0.6°C) to 2°F (1.1°C) in winter (Entrix 2004a).
Salinity	• Salinity typically increases as depth increases, with concentrations varying between 33.5 and 33.8 parts per thousand (ppt) in the Southern California Bight (Entrix 2004a).
Dissolved oxygen	• California Cooperative Fisheries Investigations' measurements from 1985 to 2001 of dissolved oxygen in the Project area range from approximately 5.6 to 6.3 milligrams per liter (mg/L) at the surface, depending on the season, to approximately 0.2 mg/L at 1,312 feet to 1968.5 feet (400 to 600 m) below the surface (Entrix 2003).
pH	• The pH in southern California coastal waters varies around a mean of approximately 8.1 (Entrix 2004a).
Surface light transmittance	• Visual transparency along the coast of Southern California varies from an average of less than 20 feet (6.1 m) to greater than 50 feet (15.2 m), with the lowest values occurring close to the coast and the highest values farther offshore (Entrix 2004a).
Trace metals	• The levels of metals in the waters of the Southern California Bight are within ranges reported for seawater in various areas around the world.
Waterborne bacteria	• In 2001, health warnings were posted at Ormond Beach near J Street for 64 days and at the industrial drain for 63 days. The frequency of exceedances for these beaches was high compared to the 10-day average frequency of closure for other beaches in the county.

Sources: Entrix 2003, 2004a.

4.18.1.2 Marine Sediment

Sediment in the Project vicinity consists of very fine to medium sand (Welday and Williams 1975). Some gravel, muddy sand, and mud are also present. Deeper escarpment and basin sediments consist mainly of very fine silts and clays.

As discussed in Section 4.12.1.1, there are no known ocean dumpsites that might contain waste hazardous materials within 0.43 NM (0.5 mile or 0.8 km) of either the proposed FSRU location or the route of the subsea pipelines (NOAA 2003a). Approximately 14 miles (22.6 km) of the route of the subsea pipelines, i.e., from milepost (MP) 4 to MP 18, would lie within the Point Mugu Sea Range. Unexploded ordinance, drones, or other debris from missile testing may be located near or within the proposed subsea pipeline corridor. Mitigation Measure HAZ-4a requires the Applicant, in coordination with the U.S. Navy, to conduct surveys at the offshore pipeline installation within and near the Point Mugu Sea Range to locate visible and shallowly buried unexploded ordnance that might be disturbed by pipeline installation.

Sediment studies have been conducted in the Southern California Bight. Most samples collected to date in the Project vicinity have been collected near the coast near harbors and outfalls. Samples were analyzed for metals, organochlorines, and polycyclic aromatic hydrocarbons. No contaminants were detected in the Project vicinity (NOAA Coastal Services Center 2006).

The construction of Port Hueneme effectively trapped much of the sediment supply to Ormond Beach. Approximately 1.9 million cubic yards (1.45 million cubic meters [m^3]) is dredged biannually from Port Hueneme and deposited to intertidal and subtidal habitats at Ormond Beach. Surficial sediment composition and quality in the Project vicinity are influenced by several factors, including tides, currents, wave action, and natural oil and gas seeps. Human influences, including dredging, surface water runoff, industrial and domestic outfalls, oil spills, and discharge from ships, also affect sediment quality.

Results from recent sediment and water sampling events reflect current water quality and sediment conditions near Ormond Beach. In August and September 2003, the Applicant collected sediment samples at the proposed offshore HDB exit points. A 100-foot (30.5 m) by 150-foot (45.7 m) site was divided into four quadrants. Sediment samples were collected in each of the four quadrants at 0-, 10-, and 15-foot (0, 3.5, and 4.6 m) depths and were analyzed for metals, chlorinated pesticides, polychlorinated biphenyls (PCBs), phenols, volatile organic compounds (VOCs), and polynuclear aromatic hydrocarbons (PAHs). Analytical results for these samples are summarized in Table 4.18-2.

The analytical results indicate that the concentration of detected analytes[1] in the sediment of the proposed offshore HDB exit location are below the lower effects range and are therefore not expected to impact benthic species.

In April and September 2004, Reliant Energy conducted sediment sampling and analysis in accordance with its NPDES Permit (No. CA0001198). Sediment samples were collected from six locations near the Reliant Energy Ormond Beach Generating Station's outfall, located approximately 2,000 feet (610 m) offshore, and were analyzed for chromium, copper, nickel, and lead. Analytical results for these samples are summarized in Table 4.18-3. In addition, the Applicant conducted sediment sampling at the proposed offshore HDB exit points.

The analytical results indicate that the concentration of metals in the sediment in the vicinity of the Reliant Energy Ormond Beach Generating Station are below the lower effects range and therefore are not expected to impact benthic species.

[1] An analyte is the substance in an analysis that is being identified or determined.

Table 4.18-2 Sediment Analytical Results – BHP Billiton LNG International Inc.

Analyte	Quadrant 1			Quadrant 2			Quadrant 3			Quadrant 4			Screening Levels	
	0’	10’	15’	0’	10’	15’	0’	10’	15’	0’	10’	15’	ERL	ERM
Metals (mg/kg)														
-- Aluminum (x 1000)	6.25	NA	8.92	7.11	8.00	9.29	6.22	9.11	10.30	7.24	NA	6.89	---	---
-- Antimony	0.09	0.28	0.14	0.15	0.11	0.14	0.14	0.12	0.1	0.09	0.04	0.07	---	---
-- Arsenic	3.24	3.41	1.84	3.46	2.37	3.9	3.9	2.63	2.04	2.67	1.65	1.61	8.2	70
-- Barium	170	116	126	97.3	110	104	104	111	107	109	81.3	84.2	---	---
-- Beryllium	0.2	0.35	0.27	0.24	0.25	0.28	0.2	0.27	0.27	0.21	0.21	0.19	---	---
-- Cadmium	0.15	0.45	0.24	0.3	0.23	0.27	0.27	0.27	0.23	0.2	0.23	0.19	1.2	9.6
-- Chromium	15.5	22	16.4	14.6	15.4	16.9	13.9	16.8	18.2	14	13.7	12.5	81	370
-- Cobalt	3	5.9	4.33	3.49	3.83	4.58	4.58	4.19	4.74	3.39	3.55	3.52	---	---
-- Copper	3	10.5	6.75	4.96	5.87	6.91	6.91	6.23	7.46	4.28	5.79	5.48	34	270
-- Iron (x 1000)	15.4	21.9	16.9	14.0	15.6	18.1	18.1	16.7	17.7	13.3	13.7	13.2	---	---
-- Lead	4.34	5.39	3.95	3.71	4.05	4.00	4.00	3.97	4.53	3.73	3.73	3.08	46.7	218
-- Manganese	196	257	231	179	203	229	229	211	230	180	170	169	---	---
-- Mercury	0.03	0.11	0.05	0.04	0.02	0.03	0.03	0.03	0.02	0.01	0.01	0.01	0.15	0.71
-- Molybdenum	0.74	1.39	0.79	1.32	0.74	1.07	1.07	0.78	0.63	0.72	0.57	0.66	---	---
-- Nickel	6.66	13	9.27	7.98	8.57	9.81	9.81	8.87	10.2	7.55	8.29	7.56	20.9	51.6
-- Selenium	0.51	0.68	0.51	0.53	0.5	0.54	0.54	0.56	0.48	0.48	0.39	0.4	---	---
-- Silver	0.06	0.17	0.09	0.07	0.03	0.06	0.06	0.06	0.05	0.02	ND	ND	1	3.7
-- Strontium	62.2	78.1	72.7	53.7	67.2	67	67	66.7	73.2	54.4	52.8	60.8	---	---
-- Thallium	0.09	0.19	0.13	0.11	0.11	0.14	0.14	0.13	0.16	0.1	0.11	0.1	---	---
-- Tin	0.99	1.25	1.09	0.86	0.94	1.03	1.03	0.99	1.02	0.84	0.7	0.7	---	---
-- Titanium	1100	1350	1350	912	1120	1230	1000	1260	1180	920	758	953	---	---
-- Vanadium	33.7	46.6	35.2	32.2	33.4	37	30.8	36.1	36.7	29.4	29.6	26.8	---	---
-- Zinc	22.7	39.9	29.2	24.3	26.5	30.7	30.7	28.5	32.5	24.6	25.1	23.6	150	410

Table 4.18-2 Sediment Analytical Results – BHP Billiton LNG International Inc.

Analyte	Quadrant 1			Quadrant 2			Quadrant 3			Quadrant 4			Screening Levels	
	0’	10’	15’	0’	10’	15’	0’	10’	15’	0’	10’	15’	ERL	ERM
Pesticides (ng/g)	No analytes were detected at or above the laboratory detection limit													
PCBs (ng/g)	No analytes were detected at or above the laboratory detection limit													
Phenols (ng/g)	No analytes were detected at or above the laboratory detection limit													
VOCs (ng/g)	No analytes, except those listed below, were detected at or above the laboratory detection limit													
-- bis(2-Ethylhexyl) phthalate	105	ND	ND	33.2	ND	ND	ND	ND	ND	18.7	ND	ND	---	---
-- Diethylphthalate	9	11.6	ND	9.5	6.6	5.6	12.4	ND	5.3	ND	ND	ND	---	---
-- DiMethylphthalate	5.5	ND	ND	ND	ND	ND	14.9	ND	ND	ND	ND	ND	---	---
-- Di-n-butylphthalate	21.9	12.9	9.4	16.1	14.2	11.8	ND	10.9	10.1	13.3	11.4	6	---	---
-- Di-n-octylphthalate	24.9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	---
PAHs (ng/g)	No analytes, except those listed below, were detected at or above the laboratory detection limit													
-- 1-Methyl naphthalene	ND	ND	ND	ND	ND	1.2	ND	ND	ND	ND	ND	ND	---	---
-- Naphthalene	ND	ND	ND	ND	ND	3.5	ND	ND	ND	ND	ND	ND	---	---

Source: Environmental Sampling and Test Results, Results of Chemical Testing of Vibrocore Samples Taken from Location of Seafloor Exit for Horizontal Directional Drilled (HDD) Borehole, March 2004.

Notes: mg/kg = milligrams per kilogram; ng/g = nanograms per gram; ND = not detected at or above the laboratory detection limit; --- = no established ERL or ERM; ERL = effects range - low (the value above which adverse effects on sensitive life stages and/or species are expected to begin); ERM = effects range – medium (the value above which adverse effects on most species are frequently observed).

Table 4.18-3 Sediment Analytical Results – Reliant Energy

Sample No.	Approximate Location	Metals (in milligrams per kilogram)			
		Chromium	Copper	Nickel	Zinc
B1	2,750 feet (840 m) NW of outfall	9.1	3.5	5.9	20
B2	1,000 feet (305 m) NW of outfall	7.6	2.8	4.9	16
B3	Along path of outfall	7.4	3.1	5.8	16
B4	1,000 feet (305 m) SE of outfall	10	11	6.3	21
B5	2,750 feet (840 m) SE of outfall	8.5	3.6	6.1	21
B6	Along path of outfall	8.0	3.7	6.7	19
ERL		81	34	21	150
ERM		370	270	51.6	410

Source: National Pollutant Discharge Elimination System 2004 Receiving Water Monitoring Report, Reliant Energy Ormond Beach Generating Station, Ventura, California, March 2005.

Notes: NW = northwest; SE = southeast; ERL = effects range - low (the value above which adverse effects on sensitive life stages and/or species are expected to begin); ERM = effects range - medium (the value above which adverse effects on most species are frequently observed).

In addition, water samples were collected at each of the six sampling stations identified above, as well as three stations well away from the outfall including one station approximately 9,000 feet (2,740 m) northwest of the outfall; one station approximately 1,500 feet (457 m) southwest of the outfall; and one station approximately 9,000 feet (2,740 m) southeast of the outfall. Temperature, dissolved oxygen, pH, and salinity were continuously measured throughout the water column during both the summer and winter sampling events. The data were measured in situ at approximately 3-foot (1 m) intervals and are summarized in Table 4.18-4.

Table 4.18-4 Water Quality Results – Reliant Energy

Parameter	Summer				Winter			
	Surface		Bottom		Surface		Bottom	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Temperature (°F [°C])	68.1 (20.1)	71.3 (21.8)	60.5 (15.9)	69.1 (20.6)	58.5 (14.7)	62.0 (16.7)	56.2 (13.4)	60.4 (15.8)
Dissolved Oxygen (mg/L)	7.72	8.47	7.73	8.41	7.42	8.42	7.04	8.47
pH (standard units)	7.72	8.47	7.95	8.09	7.96	8.22	7.97	8.22
Salinity (practical salinity units)	33.22	33.36	33.31	33.79	33.18	33.30	33.26	33.34

Source: National Pollutant Discharge Elimination System 2004 Receiving Water Monitoring Report, Reliant Energy Ormond Beach Generating Station, Ventura, California, March 2005.

Notes: Min. = minimum; Max. = maximum; °F = degrees Fahrenheit; °C = degrees Celsius; mg/L = milligrams per liter.

The California State Water Resources Control Board (SWRCB) has listed several water bodies as impaired due to sediment concentrations and toxicity exceeding regulatory criteria in the Mugu Lagoon and Port Hueneme area, which neighbor the Project area. Additionally, throughout the Southern California Bight, from Point Conception to Huntington Beach, natural discharges of liquid petroleum occur from fissures in the ocean floor. No specific impairments have been listed for the Ormond Beach area. As discussed above, the sediments in the vicinity of the offshore horizontal drill exit points were collected and analyzed for potential contamination, and no contamination was detected.

A metal recycling facility previously owned by Halaco Engineering Co. is located at Ormond Beach. The facility includes a slag (waste) pile and waste ponds that may be contaminating nearby wetlands and groundwater. The USEPA conducted an integrated site assessment in June 2006, which determined that a time-critical removal action is necessary (USEPA 2006b). Sediment barriers were installed around the waste pile to limit migration from the pile, and bulk chemicals, drums, and the contents of tanks were removed. No action has been taken to date with regard to sediments (see Section 4.13, “Land Use”).

Onshore

4.18.1.3 Groundwater Resources

Shore Crossing and Center Road Pipeline Area

Groundwater elevations range from sea level in the west to approximately 150 feet (46 m) above sea level within the Oxnard Subbasin (California Department of Water Resources 2006). According to a Gregg Drilling database for the period from 2000 to 2004, groundwater depths varied in the City of Oxnard from 6 to 35 feet below ground surface depending on the year and season (Gregg 2006). Depth to groundwater along the proposed pipeline routes in Oxnard ranges from less than 5 feet to over 10 feet below ground surface (William Lettis and Associates 2005).

The five aquifers in this area contain fresh water, except in areas of saltwater intrusion near the coast. No known groundwater wells used for public, domestic, or agricultural supply are in the immediate Project vicinity. Groundwater in the area is managed for agricultural and municipal services.

Line 225 Pipeline Loop Area

The Santa Clara River Valley East Basin is bordered on the north by the Piru Mountains, on the west by impervious rocks of the Modelo and Saugus Formations and a constriction in the alluvium on the south by the Santa Susana Mountains, and on the south and east by the San Gabriel Mountains. The surface is drained by the Santa Clara River, Bouquet Creek, and Castaic Creek. Groundwater in the subbasin is generally unconfined in the alluvium but may be confined, semi-confined, or unconfined in the Saugus Formation. Groundwater of the East Basin is managed mainly for servicing municipal demands within the Santa Clarita Valley.

4.18.1.4 Surface Water

Center Road Pipeline

Freshwater streams and waterways on the Oxnard Plain include the Santa Clara River, Calleguas Creek, Conejo Creek, the Oxnard Drain, the J Street Drain, and the Beardsley Wash-Revolon Slough Complex. Numerous other agricultural drainages throughout the Oxnard Plain are used to irrigate adjacent crops and to direct water and urban runoff to the Pacific Ocean. In most cases, these artificial waterways are highly disturbed by fluctuating water levels, vegetation maintenance, and dredging. The proposed alignment crosses several agricultural drainages and flood control channels (see Section 4.8, "Biological Resources—Terrestrial," for a list of the drainages and flood control channels).

Table 4.18-5 lists all surface water features that would be parallel to or crossed, with the proposed crossing method, by the proposed pipeline route and alternatives, including agricultural drainages and flood control channels, except for the Santa Barbara Channel/Gonzales Road Alternative. These are also identified on Figure 4.18-1.

Table 4.18-5 Surface Water Bodies along the Center Road Route and Alternatives

Location (Milepost [MP])[a]	Description of Water Body	Center Road				Point Mugu/ Casper Road	Arnold Road	Proposed Crossing Method	Alternate Crossing Method
		Proposed Route	Alt 1	Alt 2	Alt 3				
0.25	Tributary to Pacific Ocean. Unnamed agricultural drainage.	X	X	X	X			Slick bore	Cased bore
0-2	Agriculture/flood control crossing					X	X	Trench	Span
0.1 – 0.2	Mugu Lagoon Channel						X	Trench	Span
1.1 - 1.2	Mugu Lagoon Channel					X		HDB	Trench
1.6–1.8 (Alt 1)	Oxnard Industrial Drain. Concrete flood control channel.		X					Will not cross	N/A
1.8–2.8 (Alt 1)	Rice Road Drain. Concrete flood control channel.		X					Will not cross	N/A
5.0 (Alt 2)	Mugu Drain. Vegetated agricultural drainage. Concreted only at Pleasant Valley Road crossing.			X				Span off roadway	Cased bore in roadway
6.3 (Alt 2)	Tributary to Revolon Slough. Vegetated agricultural drainage. Concreted only at Wolff Road crossing.			X				Cased bore	Slick bore
6.7 (Alt 2)	Tributary to Revolon Slough. Concrete flood control channel.			X				Slick bore	Cased bore (span possible)
7.0 (Alt 2)	Revolon Slough. Concrete flood control channel.			X				Span	None feasible

Table 4.18-5 Surface Water Bodies along the Center Road Route and Alternatives

Location (Milepost [MP])[a]	Description of Water Body	Center Road				Point Mugu/ Casper Road	Arnold Road	Proposed Crossing Method	Alternate Crossing Method
		Proposed Route	Alt 1	Alt 2	Alt 3				
9.5	Nyeland Drain. Concrete flood control channel.	X			X			Cased bore	Slick bore
12.7	Tributary to Nyeland Drain. Unnamed, vegetated agricultural drain.		X					Slick bore (east of roadway)	Trench (east of roadway)
13.0	Ferro Ditch. Vegetated agricultural/flood control channel.		X					Slick bore (east of roadway)	Trench (east of roadway)
13.7	La Vista Drain. Other Waters of the U.S (as defined by the U.S. Army Corps of Engineers). Concrete flood control channel.		X	X				Slick bore (east of roadway)	Bore with roadway
10.4–10.6	Beardsley Wash. Concrete flood control channel.	X		X	X			Will not cross	N/A
10.6–11.8	Santa Clara Diversion. Concrete flood control channel.	X		X	X			Span at MP 10.0	Cased 100‘ bore
11.8–12.5	Santa Clara Drain. Concrete flood control channel.	X		X	X			Single cased bore of Santa Clara Ave. and drain	None feasible
12.5–13.7	Santa Clara Drain. Vegetated agricultural/flood control drainage.			X				Will not cross	N/A
13.0–13.1 (Alt 1)	Los Angeles Drain. Concrete flood control channel.		X					Will not cross	N/A
13.0–13.3	Unnamed agricultural drain	X						Slick bore	trenching
14.2	Unnamed agricultural drain	X						Trench	Span
14.3	Unnamed agricultural drain	X						Trench	Span

Sources: Entrix 2004b, 2005, 2006a and b; SoCalGas 2005.

Notes:

‘X’’ indicates presence of the surface water feature along the route specified.

[a]The location indicated is based on mileposts for the proposed route, unless otherwise noted.

Line 225 Pipeline Loop Project Area

The upper Santa Clara River flows westward through the very broad and low-gradient Santa Clarita Valley. Four major streams occur in the Line 225 Pipeline Loop Project area in the upper Santa Clara River watershed: the mainstem Santa Clara River, the South Fork Santa Clara River, Castaic Creek, and San Francisquito Creek. These streams, at the proposed crossings, are dry throughout most of the year until the onset of rain in the fall. The Santa Clara River includes a perennial reach downstream of the Line 225 Pipeline Loop because of wastewater discharged from the Valencia Water Reclamation Plant.

Surface water features are located parallel to, or would be crossed by, the proposed Project (see Table 4.18-6 and Figure 4.18-2). The Line 225 Pipeline Loop crosses the South Fork Santa Clara River at MP 3.7 between San Fernando Road and Magic Mountain Parkway. The Line 225 Pipeline Loop would cross the South Fork Santa Clara River (MP 3.7), the Santa Clara River (MP 5.2), and San Francisquito Creek (MP 5.6). The pipeline would cross the Santa Clara River and San Francisquito Creek at McBean Parkway by hanging it underneath the open girder bridges. The pipeline across the South Fork Santa Clara River at Magic Mountain Parkway would be installed inside a closed girder bridge. Other crossings such as at several concrete-lined flood control channels may require using existing road bridges or horizontal directional drilling (HDD). To avoid or reduce impacts on aquatic resources, dry watercourse or minor wet crossings would be open-cut-trenched during the dry season to reduce the potential for erosion.

Table 4.18-6 Surface Water Bodies along the Line 225 Pipeline Loop

Location (milepost)[a]	Description of Water Body	Proposed Route	Alternative Route	Crossing Method
5.7 (Alt)	Santa Clara River		X	trench
5.6	San Francisquito Creek Vegetated waters and unvegetated natural channel	X		Hang under bridge (open girder bridge)
5.2	Santa Clara River	X		Hang under bridge (open girder bridge)
3.7	South Fork Santa Clara River Vegetated waters and unvegetated natural channel	X	X	Insert in bridge cell (closed girder bridge)
2.4	Tributary to South Fork Santa Clara River Unnamed concrete flood control channel	X	X	Slick bore
1.8	Unvegetated natural channel	X	X	trench
1.7	Unvegetated natural channel	X	X	trench
1.0	Unvegetated natural channel	X	X	trench
0.7	Unvegetated natural channel	X	X	trench

Sources: Entrix 2004b; Entrix 2005.

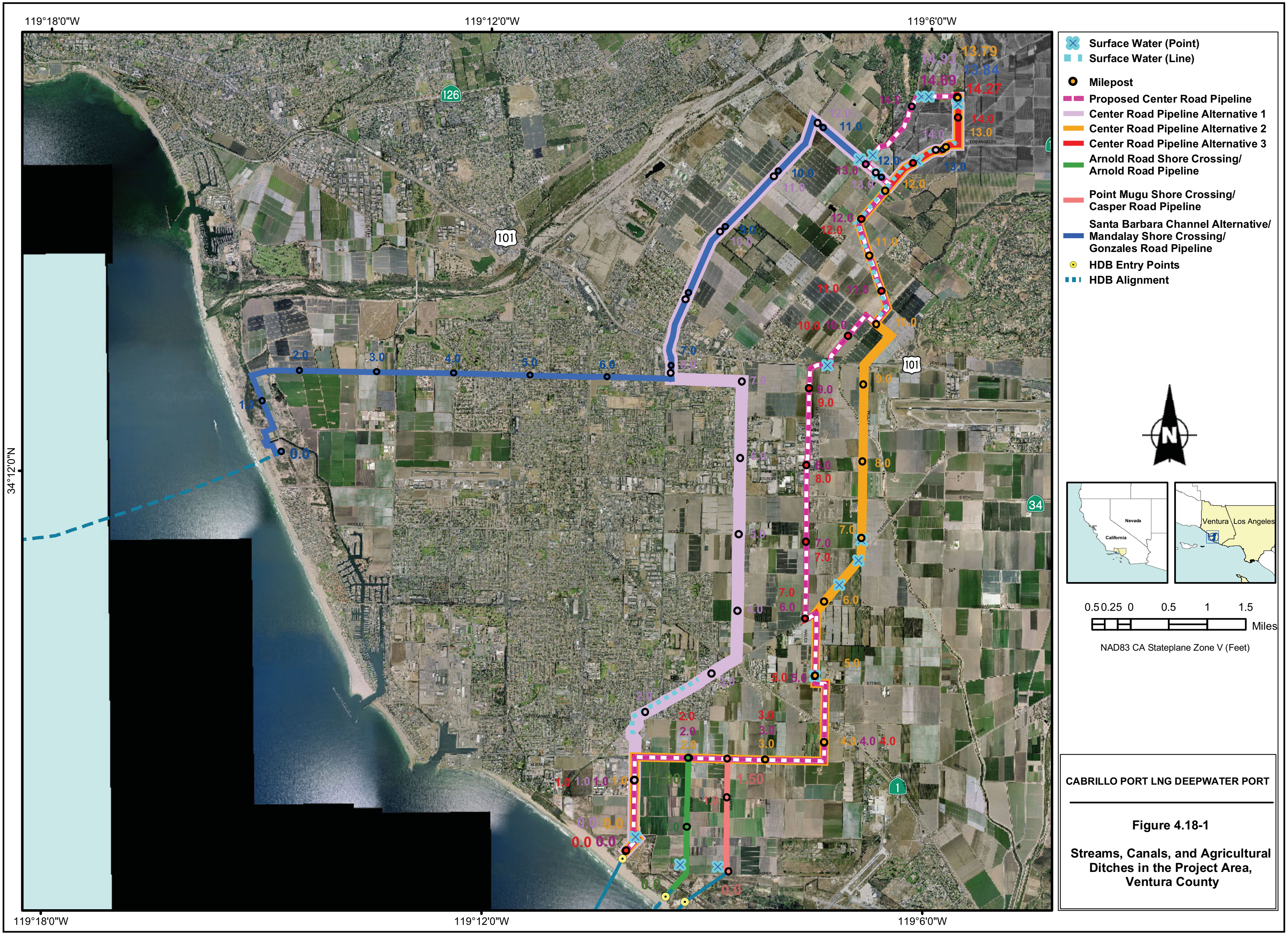
Notes:

'X' indicates presence of the surface water feature along the route specified.

[a] The location indicated is based on mileposts for the proposed route, unless otherwise noted.

Impaired Water Bodies

The SWRCB lists impaired water bodies in the State as part of Clean Water Act Regulation 303(d). Table 4.18-7 lists all the impairments (by total maximum daily load [TMDL]), based on water column, sediment, and tissue samples). A TMDL is a calculation of the maximum amount of a pollutant that a water body can receive and still meet water quality standards. A TMDL is the sum of the allowable loads of a single pollutant from all contributing point and nonpoint sources. The calculation must include a margin of safety to ensure that the water body can be used for the purposes the State



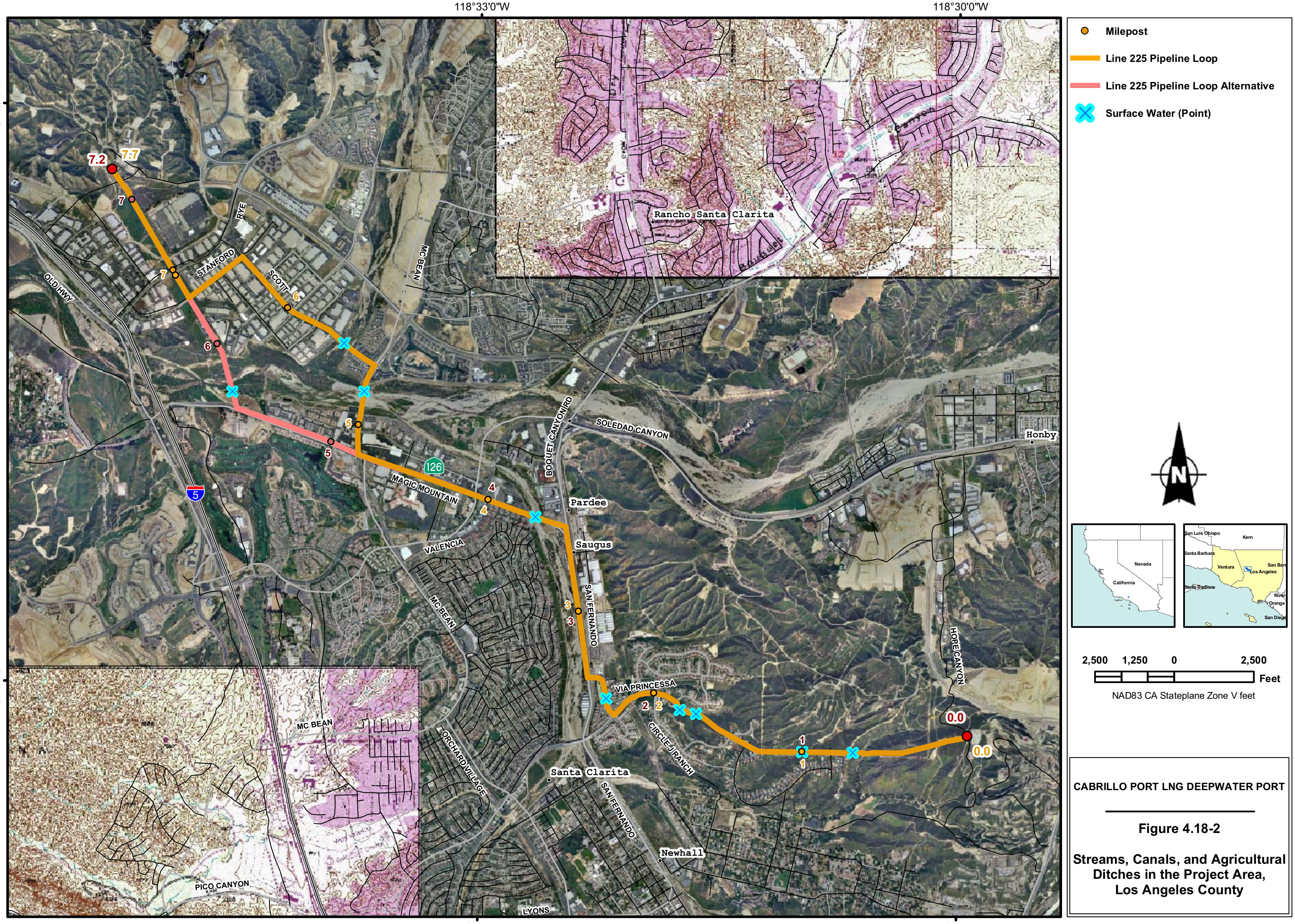
CABRILLO PORT LNG DEEPWATER PORT

Figure 4.18-1

Streams, Canals, and Agricultural Ditches in the Project Area, Ventura County

\\BUFSDL4\gis\sanfrancisco\maps\mxd\Sec4-18-WaterQuality\Fig4-18-1_StreamsCanalsDitchesVentura.mxd GIS/GRC 8-26-06

Source: Entrix 2004, 2005, BHP December 2005



CABRILLO PORT LNG DEEPWATER PORT

Figure 4.18-2

Streams, Canals, and Agricultural Ditches in the Project Area, Los Angeles County

\\BUFNT4\GIS\SanFrancisco\Cabrilloport\maps\mxd\Sec4-18-WaterQuality\Figure-4-18-2_StreamsCanalsDitchesLA.mxd GIS/GRC 1-5-06

Source: Entrix 2004

has designated. The calculation must also account for seasonal variation in water quality. Water quality standards are set by states, territories, and tribes. They identify the uses for each water body and the scientific criteria to support that use. The Clean Water Act § 303 establishes the water quality standards and TMDL programs.

Table 4.18-7 Clean Water Act Section 303(d) List Impaired Water Bodies in the Vicinity of the Cabrillo Port Project (303d list approved July 2003)

Feature Name	Pollutant/Stressor	Potential Sources	TMDL Priority; *Proposed TMDL Completion*
Center Road Pipeline			
Ormond Beach (near Oxnard Industrial Drain and J Street Drain)	Bacteria Indicators, e.g., fecal coliforms and enterococci	Nonpoint and Point Sources	Low *No date*
Calleguas Creek Reach 4 (Revolon Slough)	Nitrogen, algae, chlorpyrifos, soluble and insoluble organic compounds (pesticides), toxicity, PCBs, trash	Nonpoint and Point Sources; Agriculture	Low, Medium, and High[a] *2002 and 2004*
Calleguas Creek Reach 5 (Beardsley Channel)	Nitrogen, algae, chlorpyrifos, soluble and insoluble organic compounds (pesticides), PCBs, trash	Nonpoint and Point Sources; Agriculture	Low, Medium, and High *2002, 2003, 2004*[a]
Port Hueneme Harbor	Elevated Tissue Levels (DDT, PCBs)	Nonpoint sources	Medium *No date*
McGrath Lake	Elevated sediment levels (Chlordane, DDT, Dieldrin, PCBs), Fecal Coliform, Sediment Toxicity	Nonpoint Sources; Agriculture; Landfills	Low, Medium[a] *No date*
McGrath Beach	High Coliform Count	Nonpoint source	High *2003*
Calleguas Creek Reach 1 (Mugu Lagoon)	Copper, Mercury, Nickel, Zinc, Bird Reproductivity (DDT), Elevated Tissue Levels (Chlordane, DDT, Endosulfan, Dacthal, Toxaphene, PCBs, Arsenic, Cadmium, Silver), Nitrogen, Elevated Sediment Levels (DDT, Toxaphene), Sediment Toxicity, Excessive Sediment	Nonpoint and Point Sources; Agriculture	Medium *2002*
Line 225 Pipeline Loop			
Santa Clara River Reach 8 - W Pier Hwy 99 to Bouquet Cyn. Rd	Chloride, high coliform count	Nonpoint and Point Sources	Medium, High[a] *2002*

Source: LARWQCB 2004.
Note:
[a]Varies depending on pollutant/stressor.

4.18.2 Regulatory Setting

Water quality and sediments are regulated pursuant to Federal, State, and local laws and regulations. These regulations prescribe such things as permits for specific activities and regional water quality objectives or standards. Major Federal, State, and local laws and regulations are identified in Table 4.18-8.

Table 4.18-8 Major Laws, Regulatory Requirements, and Plans for Water Quality and Sediments

Law/Regulation/Plan/ Agency	Key Elements and Thresholds; Applicable Permits
International	
International Convention for the Prevention of Pollution from Ships (MARPOL) *- U.S. Coast Guard (USCG)*	• Annex I requires vessels to be able to store oil residues on board until the residues can be discharged to reception facilities or into the sea, providing the ship is more than 50 NM (57.6 miles or 92.7 km) from the nearest land. The oil content of the effluent must be less than 15 parts per million (ppm). The ship must have an operational oil discharge monitoring and control system, oily water separating equipment, and oil filtering system or other installation. Annex I also requires that all ships of 400 tons gross tonnage or more carry an approved shipboard oil pollution plan. • Annex IV prohibits the discharge of sewage into the sea, except when the ship is discharging ground-up and disinfected sewage using a system approved by the Administration at a distance of more than 3 NM (3.5 miles or 5.6 km) from the nearest land or sewage that is not comminuted or disinfected at a distance of more than 12 NM (13.8 miles or 22.3 km) from the nearest land; or the ship operates an approved sewage treatment plant that has been certified by the Administration. The effluent may not produce visible floating solids in nor cause the discoloration of the surrounding water. • Annex V prohibits dumping floatable dunnage, lining, and packing material within 25 NM (28.8 miles or 46.3 km) of shore. Prohibits dumping other unground garbage within 12 NM (13.8 miles or 22.2 km).
International Convention on the Control of Harmful Anti-fouling Systems on Ships (MARPOL) *- USCG*	• Anticipated to be ratified before full implementation date of January 1, 2008. • Vessels may not bear compounds (anti-fouling/biocides, etc.) on their hulls or external parts of surfaces. • Vessels may bear a coating that forms a barrier to such compounds leaching from the underlying non-compliant anti-fouling systems.
Federal	
U.S. Clean Water Act (CWA) *- U.S. Environmental Protection Agency (USEPA);* *- U.S. Army Corps of Engineers (USACE);* *- Los Angeles Water Quality Control Board - (LARWQCB)*	• The objective is to restore and maintain the chemical, physical, and biological integrity of our waters. Specifically, - Prohibits discharges of untreated sewage with a fecal coliform bacterial count greater than 200 colonies per 100 milliliters (mL), or total suspended solids exceeding 150 milligrams per 100 milliliters (mg/mL) within 3 NM (3.5 miles or 5.6 km) of the shoreline. - Requires a certified operable marine sanitation device on every vessel (U.S. and foreign) with an installed toilet. • Requires the development of a facility-specific Spill Prevention, Control and Countermeasures (SPCC) Plan for the management of fuels and hazardous materials (see also National Oil and Hazardous Substances Pollution Contingency Plan, below). • Section 401 of the CWA requires states to review projects and Federal permits to ensure that the projects are in compliance with state water quality standards.
U.S. CWA, Section 402 *- LARWQCB; USEPA*	• National Pollutant Discharge Elimination System (NPDES) permits apply to point-source discharges and are developed to ensure that these discharges comply with the standards established in the Ocean Plan and/or the Regional Water Quality Control Plan, i.e., Basin Plan. • Under the NPDES program, all point sources that discharge directly into waterways are required to obtain a permit regulating the discharge. Each NPDES permit specifies effluent limitations for particular pollutants and monitoring and reporting requirements for the proposed discharge.

Table 4.18-8 Major Laws, Regulatory Requirements, and Plans for Water Quality and Sediments

Law/Regulation/Plan/ Agency	**Key Elements and Thresholds; Applicable Permits**
	• Discharges to Federal waters that are not also waters of the State would require USEPA Region 9 approval and discharges to State waters would require LARWQCB approval. Administration of the NPDES permits, management of monitoring data submitted by permittees, compliance monitoring, and enforcement are the primary responsibility of the states. • The discharge of hydrostatic test water generated during onshore pipeline integrity testing would require an NPDES permit. • The discharge of hydrostatic test water generated during subsea pipeline integrity testing would require a separate NPDES permit, which would be obtained through USEPA Region 9 and/or the LARWQCB, depending on the discharge location. • The NPDES permit regulating storm water and point-source discharges from the FSRU would be obtained through USEPA Region 9 since it would be situated in Federal waters. The permit would regulate storm water runoff and gray water discharge from the FSRU and associated facilities. • The State of California has adopted a general storm water permit covering nonpoint source discharges from certain industrial facilities and from construction sites involving more than one acre. The Construction General Permit requires preparation of a storm water pollution prevention plan (SWPPP) and implementation of best management practices (BMPs) to reduce the potential for pollutants (chemicals and sediment) to be discharged from the construction site to waters of the State. • A SWPPP will be prepared and implemented to address the specific water quality concerns for the construction phase of the Project. • The discharge of groundwater potentially encountered during excavation and drilling would require an NPDES permit.
U.S. CWA, Section 404 - *USACE*	• The USACE is responsible for administering Section 404 Waterways Permits to regulate dredging and filling activities within U.S. waters. The permit would be developed to ensure that the proposed activity is conducted in a manner intended to protect aquatic resources, including water quality. A Section 404 Waterways Permit would be necessary for trenching across waters of the United States.
U.S. CWA Section 316(b) - *USEPA*	• Requires that the location, design, construction, and capacity of cooling water intake structures reflect the application of the best technology available to minimize adverse environmental impacts. • The USEPA promulgated these regulations in three phases: 1. Phase I – new sources meeting certain criteria; promulgated in December 2001 (66 Fed. Reg. 65256). 2. Phase II – existing electric generating plants; promulgated in July 2004 (69 Fed. Reg. 41576). 3. Phase III – certain existing facilities and includes new offshore oil and gas extraction facilities; proposed on November 24, 2004 (69 Fed. Reg. 68444 • New offshore LNG import terminals were considered for regulation in Phase III; however, the USEPA elected to not develop specific Phase III regulations for these facilities. As a result, permit requirements for cooling water intake structures at new offshore LNG import terminals will be made on a case-by-case basis based on best professional judgment.

Table 4.18-8 Major Laws, Regulatory Requirements, and Plans for Water Quality and Sediments

Law/Regulation/Plan/ Agency	Key Elements and Thresholds; Applicable Permits
U.S. CWA Section 403 (Ocean Discharge Criteria Regulations [40 Code of Federal Regulations (CFR) part 125, Subpart M]) - *USEPA*	• Designed to "prevent unreasonable degradation of the marine environment and to authorize imposition of effluent limitations, including a prohibition of discharge, if necessary, to ensure this goal" (49 Fed. Reg. 65942, October 3, 1980). • The determination of unreasonable degradation is based on the following ten factors: (1) quantities, composition, and potential for bioaccumulation or persistence of the pollutants discharged; (2) potential transport of such pollutants; (3) the composition and vulnerability of biological communities exposed to such pollutants; (4) the importance of the receiving water area to the surrounding biological community; (5) the existence of special aquatic sites; (6) potential impacts on human health; (7) impacts on recreational and commercial fishing; (8) applicable requirements of approved Coastal Zone Management Plans; (9) marine water quality criteria developed pursuant to Section 304(a)(1) of the CWA; and (10) other relevant factors. The evaluation of proposed discharges assumes BAT and BCT effluent limitations are in place as required by the CWA. • The USEPA may not issue an NPDES permit if it determines that a discharge will cause unreasonable degradation of the marine environment. If a determination of unreasonable degradation cannot be made because of a lack of sufficient information, the USEPA must then determine whether a discharge will cause irreparable harm to the marine environment and whether there are reasonable alternatives to on-site disposal. To assess the probability of irreparable harm, the USEPA is required to make a determination that the discharger, operating under appropriate permit conditions, will not cause permanent and significant harm to the environment. If data gathered through monitoring indicate that continued discharge may cause unreasonable degradation, the discharge must be halted or additional permit limitations established.
Amendments to the NPDES Regulations for Storm Water Discharges Associated With Oil and Gas Exploration, Production, Processing, or Treatment Operations or Transmission Facilities (40 CFR Part 122P	• Modifies the CWA resulting from the Energy Policy Act of 2005. • Provides that certain stormwater discharges from operations associated with transmission facilities are exempt from NPDES permit requirements. • applies to pipeline transportation of natural gas facilities • Encourages voluntary application of best management practices to minimize the discharge of pollutants. • Final rule became effective on June 12, 2006.
SPCC Plans, required under the Oil Pollution Prevention Regulation; Non-Transportation-Related Onshore and Offshore Facilities – 40 CFR § 112 - *USEPA and USCG*	• Requires facilities that store, handle, or produce significant quantities of hazardous material to prepare an SPCC Plan to ensure that containment and countermeasures are in place to prevent release of hazardous materials to the environment. • The USCG and the USEPA share responsibility for Federal On-Scene Commander (FOSC) oversight for spills. • The Project would be required to have an SPCC Plan for the onshore construction phase and also if any shoreside transfer stations are manned during operations. • An SPCC Plan is not required for vessels.
Facility Response Plan Rules, required under the Oil Pollution Prevention Regulation; Non-Transportation-Related Onshore and Offshore Facilities (33 CFR 154	• Establishes requirements for Facility Response Plans to respond to a worst-case discharge and the resulting threats to human health and the environment. • Establishes procedures, methods, equipment, and other requirements to prevent the discharge of oil from non-transportation-related onshore and offshore facilities. • Requires that facilities have the capability to adequately respond to a spill. • A Facility Response Plan would be required for the FSRU because it would store

Table 4.18-8 Major Laws, Regulatory Requirements, and Plans for Water Quality and Sediments

Law/Regulation/Plan/ Agency	Key Elements and Thresholds; Applicable Permits
subpart F and 40 CFR § 112.20) - *USCG*	264,000 gallons (1,000 m^3) of fuel on board. • Basic requirements include: immediate spill notification to the National Response Center, timely deployment of spill response equipment, and oil spill monitoring and response.
Discharge of garbage from fixed or floating platforms (33 CFR 151.73) - *USCG*	• Apply to all fixed or floating platforms when in navigable waters of the U.S. or within the 200-NM (230 miles or 371 km) Exclusive Economic Zone. The regulations prohibit the discharge of garbage within 12 NM (13.8 miles or 22.3 km) of the nearest land. Beyond 12 NM (13.8 miles or 22.3 km) from the nearest land, the discharge of food wastes that are ground so as to pass through a 25 millimeter mesh screen is permitted.
Resource Conservation and Recovery Act (RCRA) - *USEPA*	• See Section 4.12, "Hazardous Materials."
National Oil and Hazardous Substances Pollution Contingency Plan (40 CFR 300)	• Authorized under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), 42 U.S.C. 9605, as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), Pub. L. 99-499; and by section 311(d) of the CWA, 33 U.S.C. 1321(d), as amended by the Oil Pollution Act of 1990 (OPA), Pub. L. 101-380. • Applies to discharges of oil into or on the navigable waters of the United States, on the adjoining shorelines, the waters of the contiguous zone, into waters of the exclusive economic zone, or that may affect natural resources of the United States • Provides for efficient, coordinated, and effective response to discharges of oil and releases of hazardous substances, pollutants, and contaminants in accordance with the authorities of CERCLA and the CWA. • Provides for the national response organization that may be activated in response actions. It specifies responsibilities among the Federal, State, and local governments and describes resources that are available for response. • Establishes requirements for Federal, regional, and area contingency plans.
State	
California Porter-Cologne Act. The Porter-Cologne Act (California Water Code Section 13000) - *LARWQCB*	• Governs water quality regulation in California. It establishes a comprehensive program to protect water quality and the beneficial uses of water. The Porter-Cologne Act gives the State Water Resources Control Board (SWRCB) and Regional Water Quality Control Board (RWQCB) broad powers to protect water quality by regulating waste dischargers to water and land and requiring clean up of hazardous wastes.
California Coastal Act Chapter 3, Article 4 Section 30231 - *California Coastal Commission (CCC)*	• The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of waste water discharges and entrainment, controlling runoff, preventing depletion of ground water supplies and substantial interference with surface water flow, encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams.
Coastal Zone Management Act of	• Requires any applicant for a required Federal license or permit to conduct an activity, in or outside of the coastal zone, to provide to the licensing or permitting agency a certification that the proposed activity complies with the enforceable

Table 4.18-8 Major Laws, Regulatory Requirements, and Plans for Water Quality and Sediments

Law/Regulation/Plan/ Agency	Key Elements and Thresholds; Applicable Permits
1972, as amended Section 307(c)(3)(A) - *CCC*	policies of the State's approved program and that such activity must be conducted in a manner consistent with the program. The applicant is required to furnish to the State or its designated agency a copy of the certification with all necessary information and data.
California Fish and Game Code §§ 1600–1603. - *California Department of Fish and Game (CDFG)*	• Regulates activities that would "substantially divert or obstruct the natural flow of, or substantially change the bed, channel, or bank of, or use material from the streambed of a natural watercourse" that supports wildlife resources. • A Streambed Alteration Agreement must be obtained for any project that would result in impact on a river, stream, or lake.
California Ocean Plan - *SWRCB*	• Prepared and adopted by the SWRCB to protect beneficial uses of ocean waters within the State jurisdiction and to control discharges. • Incorporates State water quality standards that apply to all NPDES permits into the Section 401 Water Quality Certification. • Authorizes the SWRCB to designate areas of special biological significance and requires wastes to be discharged at a sufficient distance from these areas to protect the water quality. These designated areas include parts of Santa Catalina, Santa Barbara, Anacapa, and San Nicolas Islands, Begg Rock, and Latigo Point to Laguna Point (SWRCB 2005. • Applicable in its entirety to point source discharges to the ocean. • Defines ocean waters as "the territorial marine waters of the State as defined by California law to the extent these waters are outside of enclosed bays, estuaries, and coastal lagoons." • States "[i]f a discharge outside the territorial waters of the State could affect the quality of the waters of the State, the discharge may be regulated to assure no violation of the Ocean Plan will occur in ocean waters." *Project applicability:* • Its objectives would be incorporated into the conditions of the NPDES permit(s) and into the Section 401 Water Quality Certification.
Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of California (the "Thermal Plan") - *SWRCB*	• Adopted by the SWRCB on September 18, 1975. • Not applicable to open ocean waters; it applies only to coastal and interstate waters and enclosed bays and estuaries. • Defines coastal waters as "[w]aters of the Pacific Ocean outside of enclosed bays and estuaries which are within the territorial limits of California" and interstate waters as "[a]ll rivers, lakes, artificial impoundments, and other waters that flow across or form a part of the boundary with other states or Mexico."
Lempert-Keene-Seastrand Oil Spill Prevention and Response Act of 1990 - *CDFG Office of Spill Prevention and Response (OSPR)*	• Established the OSPR within the CDFG. • Seeks to protect the waters of the State from oil pollution and to plan for the effective and immediate response, removal, abatement, and cleanup in the event of an oil spill. • Requires immediate cleanup of spills following approved contingency plans and fully mitigating impacts on wildlife. • The OSPR has the authority to direct oil and product spill response, cleanup, and natural resource damage assessment activities • Requires oil spill contingency plans for oil transport-related facilities.

Table 4.18-8 Major Laws, Regulatory Requirements, and Plans for Water Quality and Sediments

Law/Regulation/Plan/ Agency	Key Elements and Thresholds; Applicable Permits
California Harbors and Navigation Code § 7340 - *CDFG*	• Regulates oil discharges and imposes civil penalties and liability for cleanup costs when oil is intentionally or negligently discharged to the waters of the State of California.
California Clean Coast Act	• Restricts and/or prohibits “Large Passenger Vessels” and “Oceangoing Ships” over 300 gross tons from operating incinerators or discharging oily bilge water, gray water, sewage, sewage sludge, hazardous wastes and certain other wastes within 3 NM (3.5 miles or 5.6 km) of the California coast. Discharges of any of the above must be reported within 24 hours. “Oceangoing ships” are defined as private, commercial, government, or military vessels of 300 gross tons or more calling on California ports or places.
Local	
Water Quality Control Plan: Los Angeles Region Basin Plan - *LARWQCB*	• Incorporates by reference all applicable State and Regional Board plans and policies and other pertinent water quality policies and regulations. The Plan designates beneficial uses for surface water and groundwater. • Basin Plan objectives would be incorporated into NPDES permit conditions and into the Section 401 Water Quality Certification review.

The Applicant, or its designated representative, would treat, discharge, and/or dispose of wastes and wastewaters in accordance with the appropriate Federal, State, and local laws and regulations identified. This would include:

- Installation of an U.S. Coast Guard (USCG)-approved Type II Marine Sanitary Device for sanitary sewage on every vessel with an installed toilet;
- Obtaining and meeting the discharge requirements of NPDES permit(s) for operations and construction;
- Preparation and implementation of Spill Prevention, Control and Countermeasures (SPCC) Plans for onshore and nearshore activities;
- Preparation and implementation of oil spill contingency plans for oil transport-related facilities;
- Preparation of a Facility Response Plan for the FSRU;
- Conducting HDB, HDD, and trenching activities in accordance with its Section 404 Waterways Permit;
- Obtaining and implementing SWPPPs;
- Storage of hazardous materials/wastes in U.S. Department of Transportation (USDOT)-approved containers;
- Maintenance of spill kits and absorbent materials in areas where hazardous materials are used and stored;
- Maintenance of current Material Safety Data Sheets (MSDSs) for all hazardous materials/wastes;

- Preparation and implementation of site-specific health and safety plans; and
- Disposal of hazardous materials/wastes at licensed landfills.

NPDES permits would be required for two aspects of this Project. Since the FSRU is a facility rather than a vessel, it would require an NPDES permit from USEPA Region 9 for all discharges that occur during operation because it is located in Federal waters. The Applicant filed an application for an NPDES permit for the deepwater port on December 30, 2003, and an addendum to application on September 21, 2006; its approval is pending as of December 12, 2006 (BHPB 2003; USEPA 2006c). In addition, an NPDES permit would be required from the Los Angeles Regional Water Quality Control Board (RWQCB) for onshore construction-related activities that require discharges such as storm water, hydrostatic test water, and groundwater from dewatering activities, and for operation activities such as the new metering station.

The National Response Plan (NRP), most recently revised and updated by the U.S. Department of Homeland Security in 2006, outlines procedures for interaction and coordination of response activities among Federal (USCG, USEPA, Federal Emergency Management Agency, U.S. Department of Defense, Occupational Safety and Health Administration, etc.), State, and local response agencies (police, firefighting, emergency management, first responder, etc.). The Oil and Hazardous Materials Incident Annex of the National Response Plan directs the Federal, State and local authorities to conduct training, plan and execute field exercises, share lessons learned, and, in general, develop and maintain specific procedures for responses to incidents of regional and national significance. A major incident at a deepwater port would be categorized as such an incident. The National Response Plan is supported by the National Contingency Plan, the National Incident Management System, and, at the regional level for an incident involving Cabrillo Port, by the Los Angeles/Long Beach Area Contingency Plan.

The Facility Response Plan would delineate and maintain safe operating conditions aboard the vessels. It would also specify the appropriate wind and sea conditions for operation of the vessels, refer to appropriate personnel and evaluation procedures, and require adherence to the ship’s oil spill contingency plan. The USCG would retain final approval or denial authority for the plan.

The USEPA has determined that the Clean Water § 316(b) does not apply to LNG import facilities. In its Technical Development Document for the Final Section 316(b) Phase III Rule, the USEPA stated that since there will be a limited number of LNG import facilities that will be built, a national categorical rulemaking is not justified. "Consequently, EPA decided not to establish national categorical requirements for new offshore LNG import terminals in the final Phase III rule. Instead of national categorical impingement and entrainment control requirements for existing and new offshore LNG import terminals, permit writers must impose impingement and/or entrainment controls under Section 316(b) on cooling water intake structures at LNG import terminals on a case-by-case basis using their best professional judgment” (USEPA 2006a).

In the draft NPDES permit, the USEPA Region 9 determined that it would require that the cooling water intake structure be designed to ensure a maximum through-screen design intake velocity not to exceed 0.5 feet per second. According to the draft NPDES permit fact sheet, USEPA Region 9 "believes that a maximum through-screen design intake velocity not to exceed 0.5 feet/second is an appropriate impingement control requirement for this proposed permit" (USEPA 2006c). The Applicant has modified the Project to comply with this requirement.

As discussed in Table 4.18-8, the Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of California (the Thermal Plan) would not be applicable to the Project because the Project discharges would be outside of coastal waters. The Thermal Plan defines coastal waters as “[w]aters of the Pacific Ocean outside of enclosed bays and estuaries which are within the territorial limits of California.” However, as a condition of the draft NPDES permit the USEPA has stipulated “a limit on the maximum temperature for the cooling water discharge (20°F above ambient), as well as a maximum increase of 4°F above ambient 1,000 feet (304.8 m) down current from the discharge point, which are the values in the California Thermal Plan” (USEPA 2006c). The Applicant has updated the design of the seawater cooling system discharge to comply with this stipulation (see Section 2.2.2.4 and Impact WAT-8). The USEPA has stipulated in its draft NPDES permit that “[m]onitoring for temperature at the outfall (and the ambient ocean temperature) would be required on each day of discharge to demonstrate compliance with the maximum temperature at the outfall. Modeling using EPA’s PLUMES model (or receiving water sampling) would be required on each day of discharge to demonstrate compliance with the temperature limit 1,000 feet from the discharge point.”

The Applicant or its representative would be legally obligated to adhere to International Convention on the Control of Harmful Anti-fouling Systems on Ships after it is fully ratified and International Convention for the Prevention of Pollution from Ships. In addition, the Applicant would have to adhere to any applicable discharge restrictions if new discharge restrictions are implemented in the Project vicinity due to the implementation of local TMDLs.

4.18.3 Significance Criteria

For the purposes of this document, water quality impacts are considered significant if the Project:

- Violates Federal, State, or local agency water quality standards or objectives;
- Increases contaminant levels in the water column, sediment, or biota to levels shown to have potential to harm marine organisms, even if the levels do not exceed the formal water quality criteria;
- Changes background levels of chemical and physical constituents or causes elevated turbidity that would produce long-term changes in the receiving environment of the site, area, or region that would impair the beneficial uses of the receiving water;

- Causes resuspension of contaminated bottom sediments that would degrade the quality of water downstream in violation of Federal or State agency water quality standards or objectives;
- Alters the existing drainage pattern of the site, including alteration of channel bed armoring, bank composition, or stream hydraulic characteristics, in a manner that would result in:
  - An increase in short- or long-term erosion or siltation on- or offsite;
  - An increase in the rate or amount of surface runoff that would exceed the capacity of existing or planned storm water drainage systems;
  - Flooding on- or offsite; and
  - A change of stream flow that would significantly damage either beneficial uses or aquatic life.

The following significance criterion is not applicable to the Project and is not analyzed further:

- The Project would not place permanent structures within a 100-year floodplain that would impede or redirect flood flows.

4.18.4 Impact Analysis and Mitigation

This impact analysis discusses Project impacts that occur offshore and onshore, both during construction/installation and during normal Project operations. Effects on marine biota are described in Section 4.7, "Biological Resources – Marine." Applicant-proposed measures (AM) and agency-recommended mitigation measures (MM) are defined in Section 4.1.5, "Applicant Measures and Mitigation Measures."

Impact WAT-1: Temporary Degradation of Offshore Water Quality due to Accidental Discharges

Accidental discharges of petroleum, sewage, or other contaminants from vessels during offshore construction and installation activities could temporarily degrade offshore water quality (CEQA Class III; NEPA minor or moderate adverse, short-term).

All Project construction vessels would be required to meet all applicable national and international design and operational standards. Every construction vessel must be equipped with a marine sanitation device (MSD) and adhere to the International Convention for the Prevention of Pollution from Ships (MARPOL) Annex I, IV, and V; therefore, sanitary wastes discharges would be treated, oil residues could not be discharged, and no garbage could be dumped. In addition, the Applicant, or its designated representative, would have to transport, store, use, and dispose of material and wastes in accordance with the applicable Federal and State laws listed in Table 4.12-2 in Section 4.12, "Hazardous Materials," and in Table 4.18-8 above. The presence of vessels supporting installation of the FSRU and subsea pipelines, however, would increase the potential for accidental discharges of petroleum hydrocarbons, contaminants, sewage, or gray water (from sinks and showers) exceeding water quality standards.

Petroleum and hazardous substance releases

Impact WAT-5b, below, addresses the potential impact of a worst credible case scenario involving breech of the fuel tanks on the FSRU, Project vessels, or construction vessels.

Oils, lubricants, or solvents used on board construction vessels would be stored in USDOT-approved containers and would have secondary containment. Leaks and spills of materials used on board, such as lubricants and solvents, is anticipated to be small because they would only involve the amount of material in a container in use or the contents of one piece of equipment. In that case, the facility or the vessel itself would serve as the second level of containment; however, some material could leak or spill overboard. The degradation of water quality due to these accidental discharges would be localized or limited to the immediate area of discharge, and the effects would be temporary because much of the discharged contaminant would dissipate or evaporate quickly.

If an accidental release of oily bilge water were to occur, any contamination would be localized in the area of discharge. Because bilge water from a single vessel would contain relatively small amounts of petroleum, this would have little or no long-term effect on ambient water quality.

The prevention and response provisions in the Applicant's USCG-approved Vessel Oil Pollution Contingency Plan would reduce this impact to below its significance criteria. No mitigation would be required.

Gray and Black Water

During construction, the pipelay vessel would have both a holding tank and a USCG-approved MSD for black and gray water handling as required under applicable marine and environmental regulations in force at the time of construction. Black water would be either treated with an MSD or diverted to a holding tank and offloaded in port for disposal in a land-based sewage treatment plant in accordance with Federal and State regulations. According to the Applicant, gray water would be either discharged directly overboard or diverted to the holding tank/MSD for subsequent disposal in a land-based sewage treatment plant, depending on the legal requirements of the area. This is further discussed in Impact-5a under "Project Support and Construction Vessels."

All other waste would be stored on board or processed to enable discharge of wastewater once purified to an acceptable level, in accordance with applicable marine and environmental regulations in force at the time. Regulations do not require contingency plans for the accidental discharge of gray or black water. Gray water discharge is not regulated in Federal waters.

Construction and supply vessels could accidentally discharge gray water or untreated sewage. MSDs can malfunction, and untreated black water could be discharged in an unregulated area where it could temporarily alter water quality. While the discharge may contain harmful constituents, any accidental discharge from construction vessels would be limited to the size of their holding tanks. The exact size of the holding tanks is not known. The pipelay vessel (the construction vessel with the highest capacity for both black and gray water) would house up to 200 personnel for 35 days. Based on an assumption of between 50 and 75 gallons of gray water and 5 gallons of black water per person per day, a maximum of between 10,000 and 15,000 gallons (37.9 and 56.7 m^3) of gray water and 1,000 gallons of black water would be generated over a 24-hour period. As stated previously, gray water and treated black water can be legally discharged outside of California state waters. Accidental discharges to California waters would temporarily alter water quality; however, the impact is anticipated to be short-term, given the volume of a potential spill and the dilution factor of the quantity of water in the ocean. The alteration of water quality is not quantifiable because the exact composition of gray water or black water at any time would differ daily. Any accidental discharges would be limited to the 35-day construction period and therefore would be temporary and unlikely to adversely affect coastal waters or the shoreline (see Table 4.18-7 above). Therefore, this impact is below its significance criteria and no mitigation would be required.

Impact WAT-2: Short-Term Increase in Turbidity or Accidental Unearthing of Contaminants during Offshore Construction

The installation of the FSRU and subsea pipelines could disturb seafloor sediments or release drill cuttings or fluids, causing a short-term increase in turbidity or accidental unearthing of contaminants (CEQA Class III; NEPA minor or moderate adverse, short-term).

The offshore pipelines would be laid on the surface of the seafloor and therefore no excavation of contaminated sediments would occur. The pipelaying process could stir up contaminated surficial sediments; however, such disturbance would be of small quantities for a short duration, and these sediments would rapidly settle back to the seafloor. Also, the Applicant would conduct an unexploded ordnance survey along the path of the pipeline in the Pt. Mugu Sea Range (see MM HAZ-4a in Section 4.12, "Hazardous Materials").

During installation of the FSRU (20 days) and pipeline (35 days), approximately 10 acres (4 hectares) of seafloor would be temporarily disturbed and thus temporarily increase turbidity in the water column. The disturbance of seafloor sediments during the installation of the FSRU, mooring system, and offshore pipelines could degrade water quality because of an increase in turbidity or resuspension of contaminated sediments.

The temporary increase in turbidity could reduce light penetration, discolor the ocean surface, alter the ambient water chemistry such as pH and dissolved oxygen content, or interfere with filter-feeding benthic organisms sensitive to increased turbidity. Potential effects on marine organisms are discussed in Section 4.7.4 under Impact BioMar-1. The increase in turbidity would depend on the equipment used, sediment grain size and settling rates, and bottom currents. In the northern Santa Monica Basin, where the FSRU site and offshore pipelines would be located, below-surface current velocity can range from approximately 9.8 to 39.4 feet per minute (0.1 to 0.4 knots, or 5 to 20 cm per second), depending on depth and season (Hickey 1993).

The route of the proposed offshore pipelines traverses dense sand and silty sand in the near shore areas, sandy silts and silts near the shelf edge, and fine grain to clays on upper ridge slopes. The proposed FSRU location contains a thin clay layer overlying hard or dense turbidite deposits (Fugro 2004). Fine sands settle approximately 3.3 feet (1 m) in just a few minutes (or at a rate of approximately 0.02 feet [0.6 cm] per second), depending on grain size; and fine silts settle at a rate of 4 feet (1.2 m) per day, or approximately 0.000046 feet (0.00139 cm) per second (USACE and Port of Oakland 1998). Clays remain in suspension longer than the fine silts. These data indicate that along the pipeline route where sands are present, turbidity would likely increase only during construction and for several minutes after construction activities have ceased. In areas with more silts and clays, turbidity would likely increase above normal levels during construction and for a day or two afterwards. Any adverse impacts from an increase in turbidity during pipeline installation would be considered short term and minor.

Some sediment may be contaminated with pollutants such as heavy metals. However, there are no known locations of contaminated sediments at the mooring turret, along the subsea pipeline route, or near Ormond Beach, and therefore there is no anticipated release of pollutants (see Sections 4.12.1.1 and 4.18.1.2).

During the anchor embedment period (24 hours per day for 20 days), nine high-holding-power conventional drag-embedded anchors would be placed on the seabed and dug in for embedment; therefore, turbidity would increase near the seafloor for this period of time and potentially for a several days afterwards since there are clays present in this area. The change in water quality in this area would be expected to confined to the area near the sea floor, given the depth of water (2,850 feet or 869 m), and the effect would last only for the period of embedment and potentially for a several days afterwards. Therefore, the impact on water quality would be less than significant.

The subsea pipelines would be laid on the seafloor, except for the HDB beginning at a water depth of about 43 feet (13 m). Three telecommunication cables would be crossed: the Navy RELI cable, the Navy FOCUS cable, and the Global West cable. Both of the Navy cables are buried beneath the seabed while the Global West cable, which was never in operation, is laid on the seafloor. Concrete pillows would be installed for the pipeline to rest above the cable. As the pipeline is laid and where the pillows are installed, sediments immediately under and adjacent to the pipeline and pillows would be dislodged and suspended in the water column. The increase in turbidity would depend on the size of the particles and the force by which the pipeline is laid. Nonetheless, the suspension of sediments would be localized and temporary, as discussed above. Turbidity levels would be anticipated to return to their normal range within a several days; therefore, the effect on water quality would be below the significance criteria and the effect would be temporary.

Installation of the shore crossing pipelines would be conducted using HDB. Preparation of the HDB exit hole locations would involve excavating an area for drill cuttings to accumulate. Turbidity would increase in the vicinity of the exit holes. The change in turbidity would be expected to last only for the period of the initial excavation because this area is within a sand zone, and when the drill cuttings are deposited as the HDB exits through the exit holes, and would be temporary, highly localized, and not significant. As stated previously, recent sampling in the area of the proposed exit holes did not reveal the presence of contamination.

Literature shows that drilling fluid forms lightweight flocs (masses resembling wool formed by the aggregation of a number of fine suspended particles) when it mixes with seawater. Direct measurements of seafloor frac-outs (releases of drilling fluids) have demonstrated that, upon release, the warmer drilling fluid can extend upward into the cooler water column where buoyancy-induced turbulence disperses the drilling fluid, and currents transport the dilute mixture well away from the discharge point (Coats 2003). This tendency, however, is more likely to occur in deeper water associated with oil and gas drilling.

The HDB system is designed to control circulated drilling fluid in a semi-closed loop system to prevent the potential for “frac-out.” Before the HDB drill head exits the seafloor at the HDB exit hole, the majority of the drilling fluid in the annulus would have been static for several days and the surrounding formation would act as a heat sink. It is anticipated, therefore, that the drilling mud would be at or near equilibrium temperature with the seawater (Hann 2006c). Therefore, the buoyancy of escaped drilling fluid would be less than occurs at typical deep water drilling sites (Hann 2006a).

At the offshore exit point, the Applicant would construct a transition excavation (see Section 2.6.1, “Shore Crossing via HDB”), which would contain any drilling fluids released when the drill head exits the seafloor, estimated at a maximum total of 10,000 gallons (38 m^3) from both HDB exit holes (5,000 gallons [19 m^3] per exit hole) and consisting of 95 to 98 percent water and 2 to 5 percent bentonite clay. The Applicant would use an HDB suction pump located near the cutting head with sufficient capacity to withdraw the majority of the anticipated drilling fluid volume as it flows toward the penetrated seafloor. Some drilling fluid would flocculate and disperse into an area near the exit point, temporarily increasing turbidity in the area; however, divers would be stationed at the site during HDB operations to vacuum the released material until it clears. The vacuumed drilling fluid and seawater would be collected in holding tanks on a support barge and disposed of as required. This increase in turbidity would be temporary and confined to the area immediately surrounding the transition excavations.

Following construction and installation of the offshore and shore crossing pipelines, these pipelines would be hydrostatically tested to ensure that there are no leaks. The test water would be treated with an oxygen scavenger and a corrosion inhibitor. A biocide would be added only if the test had to be conducted in excess of seven days.

Hydrostatic testing of these pipelines is described in Section 2.6.2.5, “Post-Lay Testing.” Following the test, this water would be collected and disposed of in accordance with Federal, State, and local regulations and would not be discharged to the ocean.

This impact would not exceed its significant criteria, and no mitigation measures would be necessary.

Impact WAT-3: Short-Term Degradation of Surface Water or Groundwater Quality due to Accidental Release of Drilling Fluids

Accidental releases of drilling fluids at the shore during construction could degrade surface water or groundwater quality for the short term (CEQA Class II; NEPA minor or moderate adverse, short-term).

The Project would include shore crossing via HDB. The HDB boring process uses drilling fluid to run the bore motor in the bore head to cut through the earth material, to seal off fractures in the formation, and to lubricate the bore pipe during installation (see Appendix D1). The drilling fluid is pumped down the inside of the bore pipe and exits through the bore head. The fluid is drawn into the outer casing that is being installed simultaneously. The fluid returning is called “returns.” At the beginning of the bore, a large percentage of the drilling fluid returns to the bore site. As the bore progresses, more returns are absorbed by the earth or rock formation or are contained in the bore casing and do not return to the bore site. As the bore proceeds, returns may gradually decrease until a point where a complete loss of returns could occur. This loss would occur because of the porosity of the substrate and gravity. It is common for no drilling fluid to return to the drill site during the majority of a bore; it does not indicate, however, that drilling fluid is impacting the marine environment.

Geotechnical investigations indicate favorable boring conditions; however, the porosity and composition of the subsurface soils and past experience indicate a possibility that loss of returns would occur. This loss of returns does not mean a release of drilling fluid would occur; rather, it could indicate that the existing sediment formations are absorbing the material and that the boring pressures would not be strong enough to force the drilling fluid back to the drilling site. The bedding arrangement of the nearshore zone would result in the absorption of the drilling fluids into the formation.

Under normal operations, drilling fluids would remain in the HDB boreholes. Drilling fluids from drilling equipment include oils, hydraulic fluid, and drilling fluids (bentonite slurry). If cracks or fissures in the subsurface are encountered during drilling, drilling fluids can travel along them to the groundwater and enter adjacent surface water bodies. Releases of drilling fluids (inadvertent return of drilling fluids such as bentonite) could temporarily reduce water quality where released.

The Applicant has incorporated the following measures into its Drilling Fluid Release Monitoring Plan (see Appendix D1) to reduce the potential of a drilling fluid release:

- Adjust the viscosity of the drilling fluid mixture to match the substrate conditions;

- Closely monitor boring pressures and penetration rates so use of mud pressure will be optimum to penetrate the formation;
- When loss of circulation occurs, spend very little time trying to regain returns once under the sea floor, because doing so may result in overpressurization at a single point and the subsequent migration of drilling fluid to the surface, i.e., frac-out; and
- Use the best available engineering techniques to minimize the volume of lubricants applied to the cables and discharged to the marine environment and to contain the lubricant within the conduit. Techniques include the precise computation of required lubricant quantities and the use of lubrication equipment such as sealed containers, feeder systems, foam spreaders, front-end lubricant filled bags, and conduit inserts and collars.

An evaluation of the effects of releases of drilling fluids on terrestrial resources is presented in Section 4.8, "Biological Resources – Terrestrial," and a discussion of the releases of drilling fluids in upland areas is presented in Section 4.12, "Hazardous Materials." By incorporating mitigation measures, this impact associated with HDB would be reduced to below its significance criteria.

<u>Mitigation Measure for Impact Wat-3: Short-Term Degradation of Surface Water or Groundwater Quality due to Accidental Release of Drilling Fluids</u>

MM WAT-3a. **Drilling Fluid Release Monitoring Plan.** The Applicant shall implement its Drilling Fluid Release Monitoring Plan to minimize the potential for releases of drilling fluids, to properly clean up drilling fluids in the event of a release, and notify appropriate agencies should a release occur. The plan (see Appendix D1) would incorporate best management practices to reduce the impacts from releases of drilling fluids, including the following:

- Maintaining containment equipment for drilling fluids on site;
- Adding a non-toxic color dye to the drilling fluids to easily and quickly detect release of drilling fluids;
- Ensuring that a qualified environmental monitor or suitably trained water quality specialist is on site full time near sensitive habitat areas during HDB activities;
- Stopping work immediately if there is any detection of bentonite seeps into surface water or sensitive habitats, for example, by a loss in pressure or visual observation of changes in turbidity or surface sheen;
- Reporting all bentonite seeps into waters of the State or sensitive habitat immediately to the Project's resource coordinator, the CSLC, the Los Angeles RWQCB, and the appropriate resource agencies: National Oceanic and

Atmospheric Administration Fisheries, U.S. Fish and Wildlife Service, the U.S Army Corps of Engineers, the California Department of Water Resources, the California Reclamation Board, the applicable city (Oxnard or Santa Clarita) and county (Ventura or Los Angeles); and

- Cleaning up and properly disposing of any release of drilling fluids to the satisfaction of regulatory agencies.

Implementation of the Drilling Fluid Release Monitoring Plan would minimize the volume of a potential accidental release of drilling fluids, and if such a release were to occur it would be quickly identified and reported to the appropriate regulatory agencies and as much of the spilled material as feasible would be removed. Therefore, this impact would be reduced to below its significance criteria.

Impact WAT-4: Short-Term Increase in Erosion due to Construction Activities

Boring and trenching at stream crossings, including release of hydrostatic test water, could cause short-term increases in erosion (CEQA Class II; NEPA minor adverse, short-term).

The movement of equipment and materials during construction could destabilize the soil surface and increase erosion potential from water and wind along the route and in the staging areas. Construction activities and loss of vegetation could cause accelerated erosion on steep slopes and in erosion-susceptible soils. Also, construction activities could cause erosion before vegetation is re-established. Any of these scenarios could lead to potential sedimentation of nearby creeks and drainages.

The most likely time for erosion to occur is after initial disturbance of the unpaved ground surface and before re-establishment of vegetative cover or placement of pavement, as appropriate. A soil's susceptibility to erosion varies and is a function of its characteristics such as texture and structure; topography (steepness of slope); surface roughness; amount of surface cover (vegetative or other); and climate. Erosion potential increases the longer soils are left bare. Erosion from water mainly occurs in loose soils on moderate to steep slopes, particularly during high-intensity storm events. Changes in drainage patterns as a result of the Project's construction could result in erosion of the soil following construction.

Erosion is not anticipated in the Center Road Pipeline area or in areas adjacent to the proposed alternatives because of the relatively flat to gently sloping topography; however, there are certain soils along the pipeline that have slight to moderate erosion potential because they have a slight slope (between 2 and 9 percent) (see Section 4.5, "Agriculture and Soils"). Erosion in this area could lead to increased turbidity in agricultural drainages. Erosion could occur along the parts of the Line 225 Pipeline Loop located in mountainous terrain, with slopes ranging from 2 to 50 percent. Erosion in this area could increase the turbidity in the Santa Clara River or one of its tributaries.

The proposed pipelines would cross several streams. During construction, slick bore, case bore, and trenching activities and the excavation of drilling pits could lead to sedimentation of stream channels where water is flowing. This could increase turbidity in those streams to levels above water quality standards. Trenching would likely cause the greatest increase in turbidity. To reduce the impact of increased turbidity, the Applicant would implement erosion control measures (see AM TerrBio-1a in Section 4.8.4).

If groundwater were encountered during trenching, the area would be dewatered. Section 2.7.1.2 outlines the measures that would be undertaken if groundwater were encountered. The dewatering would be managed under the oversight of the Los Angeles RWQCB, thus minimizing the likelihood of erosion. Because dewatering would only occur when a trench would be open, impacts on groundwater resources would be unlikely. If trenching were to occur at a location of flowing water, the method of water diversion would be addressed in the CDFG Streambed Alteration Agreement; therefore, no deleterious impacts to the water quality of the diverted water would be anticipated.

Some of the water bodies crossed are listed as impaired under the Clean Water Act (see Table 4.18-7 above), and TMDL determinations are being developed for each. If any of the TMDLs are finalized by the time construction begins, the Applicant, or its designated representative, would have to adhere to the applicable conditions of the TMDL.

Following construction and installation of the Center Road and Line 225 Pipeline Loop pipelines, the pipelines would be hydrostatically tested to ensure that there are no leaks. Because these tests are expected to be relatively short, the test water would not be treated with any chemicals. Hydrostatic testing of these pipelines is described in Section 2.7.1.8, "Hydrostatic Testing." During the test, the water would be containerized and then discharged at a Publicly Owned Treatment Works in accordance with Federal, State, and local regulations (Hann 2006b).

AM TerrBio-1a. **Erosion Control** would apply to this impact (see Section 4.8, "Biological Resources – Terrestrial").

Mitigation Measures for Impact WAT-4: Short-Term Increase in Erosion due to Construction Activities

MM WAT-4a. **Strategic Location for Drilling Fluids and Cuttings Pit.** The Applicant or its designated representative shall ensure a pit has been excavated at the exit hole to collect and contain the drilling fluids and cuttings. Engineering controls shall be installed to ensure that fluids remain contained in the pit, including:

- Locating the entry pit and exit pit sufficiently far from a stream bank and at a sufficient elevation to avoid inundation by the stream and to minimize excessive migration of groundwater into the entry pit or exit pit;

- Isolating the entry pit and exit pit with silt fencing to avoid sediment transport into the surface water body;
- Isolating the spoils storage from the excavation of the entry pit using silt fencing to avoid sediment transport;
- Undertaking and completing proper disposal of excess spoils; backfilling and restoring the original contour of the entry pit and exit pit; and revegetating the area upon completion of the bore;
- Monitoring the drilling fluid, if a release of drilling fluids occurs, by a qualified environmental monitor or suitably trained water quality specialist to determine the appropriate cleanup response; and
- Consulting with regulatory agencies to determine the next appropriate step to clean up the area.

MM WAT-4b. **Transport Excess Trench Spoils Offsite.** Excess trench spoils that are not used to backfill trenches shall be transported and disposed of offsite at an approved facility.

MM WAT-4c. **Monitor Stream Crossing Construction.** A qualified environmental monitor or suitably trained water quality specialist shall be present at each stream crossing construction site to ensure compliance with applicable permits and mitigation.

MM GEO-1b. **Backfilling, Compacting and Grading** would apply here (see Section 4.11, “Geologic Resources and Hazards”).

With the application of these mitigation measures, designed to alleviate soil erosion during and after construction, the potential erosion impacts associated with the Project would be reduced to below the significance criteria.

Impact WAT-5a: Degradation of Water Quality due to Accidental Release of Untreated Gray Water, Deck Drainage, and other Discharges that do not Meet Water Quality Standards

The FSRU or other Project vessels could accidentally release small amounts of contaminants, including bilge water, detergents, or human waste, to marine waters in excess of water quality standards (CEQA Class III; NEPA moderate adverse, short-term).

The FSRU would have multiple discharges including treated black water, grey water, bilge water, and ballast water. The discharge types, quantities, and treatment, if needed, are described below.

Submerged Combustion Vaporizers

The submerged combustion vaporizer (SCV) process generates excess freshwater. These units would generate approximately 200,000 gallons (757 m^3) per day of clean, slightly acidic, fresh water. None of this water would be directly discharged to the ocean. The water produced by the SCVs would go to a storage tank where it would be distributed to the end users on a continuous basis, e.g., for accommodation and to the demineralization plant and ballast tanks, and on an intermittent basis, e.g., for engine room deck washdowns, LNG loading arm water curtain, firewater system flush, and freshwater makeup. Some water from the SCVs would be recycled through the demineralization plant and fed back into the SCV. Approximately 5,077 gallons (19.2 m^3) would be used onboard the FSRU as deck washdown water for one eight-hour weekly event. Approximately 3,370 gallons (12,757 liters) per day would be treated for use as potable water for a 30-person crew (see “Potable Water” in Section 2.2.2.6). Approximately 94,300 gallons (357 m^3) per day would be used for ballasting operations (see “Ballast Water” below). Additional SCV water would be sent through the pH adjustment, UV oxidation, and/or filtration system for use as bilge water and in the sanitary systems.

Gray Water and Sanitary Wastes

The volume of gray water) generated on board would be approximately 2,625 gallons (9.9 m^3) per day, assuming that each of the permanent crew of 30 personnel would use 87.5 gallons (0.33 m^3) per day (Klimczak 2006). The annual volume of gray water would be approximately 958,175 gallons (3,627 m^3). The gray water would be treated using filtration to separate particulate matter and UV oxidation to destroy dissolved organic materials. Treated gray water from the FSRU to the ocean would be discharged from a port in the stern below the water line, in accordance with a facility-specific NPDES permit issued by the USEPA.

Sewage (also known as black water) that would be generated on board the FSRU is estimated at approximately 87 gallons (0.33 m^3) per day, or 2,642 gallons (10 m^3) per month, or 31,755 gallons (120 m^3) annually (Klimczak 2006). Black water would be treated aboard the FSRU using a USCG certified Type II Marine Sanitation Device with a sewage digester to reduce the black water volume. The MSD would generate 87 gallons per day of treated black water and 57 gallons of sludge per day. The liquid effluent from the treatment system would be discharged to the ocean in accordance with the facility’s NPDES permit and the sludge would be containerized and transported to shore for proper disposal at a local wastewater treatment facility once every three months in accordance with Federal, State, and local regulations. The draft NPDES permit for this discharge would require a total residual chlorine (TRC) concentration in the discharge of at least 1 milligrams per liter (mg/L) with a maximum TRC concentration of 10 mg/L. “EPA Region 9 has included this same limit in permits for offshore oil and gas facilities and believes the limit is appropriate for the LNG import terminal as well. Monthly monitoring is required to demonstrate compliance with the TRC limits for the discharge” (USEPA 2006c).

All discharges from the FSRU must comply with the NPDES permit. The USEPA has determined that compliance with the NPDES permit would result in compliance with the Ocean Discharge criteria. Because of the small volume of effluent from an approved secondary treatment device and the distance of the FSRU from shore, this discharge is unlikely to affect coastal waters or the shoreline.

Deck Drainage

Deck drainage consists of stormwater runoff and washdown water from the facility. The total deck surface would be 199,853.5 square feet (18,567 square meters). The annual average rainfall in Oxnard from July 1948 to July 2003 was 14.77 inches (37.5 cm) (Western Regional Climate Center 2006). Therefore, the anticipated annual deck drainage from stormwater would be approximately 1.84 million gallons (6,965 m^3). The actual volume may vary because precipitation values for the FSRU locations are not available at this time and this rainfall value used in the calculation is for onshore locations.

In addition, weekly washdown would be approximately 5,077 gallons (19.2 m^3) (see Section 2.2.2.3) for a total estimated annual deck washdown of approximately 264,000 gallons (999 m^3).

For safety reasons, all rainwater and deck washdown water would be allowed to flow off the FSRU unimpeded along the length of the facility, except in secondary containment areas where the water could become contaminated with oil. Water within the secondary containment areas would be processed through an oil/water separator before discharge to the ocean. The separator would be designed to handle the maximum anticipated flows and would be designed to meet the performance standards of the USEPA and the facility's NPDES permit. Oil collected in the oil/water separator would be containerized and transported to shore for proper disposal in accordance with Federal, State, and local regulations.

Cooling Water

A closed loop tempered water cooling system would cool the four generator engines onboard the FSRU, and seawater would not be used for engine cooling except when the closed loop system is shut down for maintenance, an estimated four days per year, when a back-up seawater cooling system would operate. The seawater for non-contact cooling during this four-day period would be an estimated 181,486 gallons (687 m^3) per hour or 4,360,000 gallons (16,504.4 m^3) per day for the four-day period. Annual discharges over four days would be approximately 17.4 million gallons (66,000 m^3) per year.

An inert gas generator (IGG) would generate inert gas that would be used to purge natural gas from FSRU gas-related equipment during maintenance activities, such as tank inerting, and decommissioning. These types of maintenance activities would occur for four days annually. The IGG unit would be of a standard marine type used on LNG carriers. The IGG requires non-contact seawater cooling water. It would use 435,000 gallons (1,646 m^3) of seawater per hour or 10.4 million gallons (39,500 m^3) per day for four days. Annual discharge would therefore be 41.8 million gallons (158,100 m^3). Cooling water would be discharged at the stern below the water line.

Seawater used in the backup seawater cooling system or the IGG would be treated with hypochlorite and copper to inhibit marine growth. Chemical dosing of the cooling seawater is 50 µg/liter of hypochlorite and 5 µg/liter copper. Anticipated annual quantities of hypochlorite and copper would be 7.3 lbs (3.3 kg) and 0.73 lbs (0.33 kg), respectively; however, actual discharges concentrations would be dictated by the NPDES permit. If issued, the license for the deepwater port would be conditioned upon issuance of a NPDES permit that would incorporate any discharge limitations or other USEPA requirements.

Bilge Water

Bilge water, i.e., the water that collects in the bottom of a ship as a result of leaks through propeller shafts, etc., is not anticipated to collect in the FSRU because it would not have a propulsion system. Some water may collect, however, from condensation and leaks in the cooling water system. Although this water would be anticipated to be clean, it would be processed through the oil/water separator prior to discharge to the ocean. The volume of bilge water is estimated to be 240,000 gallons (910 m^3) per year. Oil collected in the oil/water separator would be placed in drums for subsequent disposal at an onshore licensed hazardous waste disposal in accordance with Federal, State, and local regulations.

Fire Suppression Water

The main firefighting system would be tested annually using approximately 105,700 gallons (400 m^3) of seawater, then flushed with an equal volume of fresh water generated by the submerged combustion vaporizers. Each of the four firefighting pumps would be tested monthly (one pump each week for 48 weeks per year) for approximately 15 minutes and would require 5,725 gallons (21.7 m^3) per minute, or 85,855 gallons (325 m^3) per test. Consequently, the volume of seawater required for testing the firefighting pumps would be approximately 4.12 million gallons (15,600 m^3) per year. In addition, each of the 25 deluge valves onboard the FSRU would be tested monthly using a total of approximately 49,575 gallons (188 m^3) per month of fresh water, generated by the submerged combustion vaporizers. The total firefighting water demand for the FSRU, in the event of an actual fire, is estimated to be 634,000 gallons (2,400 m^3) per hour.

Ballast Water

Ballast water would be discharged in accordance with MARPOL and USCG regulations and protocols. During FSRU ballast operations, ocean water would be pumped into ballast tanks and shifted from one tank to another to keep the vessel evenly balanced or discharged back to the ocean, as required. Ballast water would not contain corrosion inhibitors or biocides, and pumps would be screened to minimize entrainment of aquatic organisms. Ballast water discharge would likely be at the bow and stern below the water line.

Ballast water originating from the SCVs would have been neutralized with a soda ash solution (see Section 2.2.2.3) and would have the following characteristics: sodium – 50 mg/L; total dissolved solids – 485 mg/L; nitrate-N – 1.13 mg/L; and pH within the range of 6 to 9 standard units. The draft NPDES permit would impose a pH limit of 6 to 9 standard units to SCV wastewater prior to mixing with seawater in the ballast tank and weekly monitoring of the SCV wastewater would be required to demonstrate compliance with the limit.

Any discharge of ballast water would contain little or no petroleum or other contaminants, and the discharge, if any, to receiving waters would be highly localized and temporary. Impacts occurring as a result of these regulated discharges would be less than the significance criteria. Liquefied natural gas (LNG) carriers would come to the FSRU carrying some ballast water, which would be exchanged outside the 200-NM (230 miles or 371 km) statutory limit according to regulations. While offloading their LNG cargo, the carriers would do just the opposite of the FSRU and pump ballast water into their tanks to compensate for the weight of LNG discharged to the FSRU.

The FSRU would maintain small quantities of other hazardous materials such as paints, solvents, lubrication oils, and the odorant. These would be stored in accordance with the Facility's Hazardous Communication Plan as outlined in 33 CFR 150 subpart G. A spill response would be addressed according to the FSRU's Facility Response Plan Any spills would be cleaned up immediately. In the unlikely event that any of these materials entered the marine environment, the quantity would be extremely small, and the FSRU would be too far offshore to impact coastal water or the shoreline.

Each of the FSRU's water uses and discharges is described in more detail in Sections 2.2.2.3, "LNG Receiving, Storage, and Regasification Facilities," 2.2.2.4, "Utilities Systems and Waste Management," 2.2.2.5, "Safety Systems," and 2.2.2.6, "Other Operations." Impacts on the ocean environment from these discharges are discussed in Section 4.7, "Biological Resources – Marine." Appendix D5, the Sea Water Operating Systems and Design Features, contains more information on the FSRU's ballast water system.

Project Support and Construction Vessels

All Project support and Project construction vessels would meet applicable national and international design and operational standards. Vessels over 300 gross tons are prohibited by the California Clean Coast Act from discharging oily bilge water, gray water, or sewage within 3 NM (3.5 miles or 5.6 km) of the coastline, and vessels equipped with toilets are required to install an MSD. MARPOL regulations apply in Federal waters. No vessels can discharge oil residues in the Project vicinity under Annex I of MARPOL. Vessels operating more than 3 NM (3.5 miles or 5.6 km) from the coast must either grind up and disinfect their sewage, or use an MSD under MARPOL Annex IV. Gray water is not regulated in federal waters and therefore can be discharged untreated in federal waters. Gray water is shower, bath, and laundry water. Gray water and treated black water can be discharged in Federal waters and as allowed by applicable Federal law and international agreement. Construction vessels would be required to be underway and out of State waters before discharging gray and treated black water.

Since no vessel could discharge gray water, black water, or bilge water within 3 NM (3.5 miles or 5.6 km) of shore and all potential discharges would be in the open ocean, it would be unlikely that any discharges from Project support or construction vessels would alter water quality along the coastline.

As discussed in Impact WAT-1, the pipelay vessel would have both a holding tank and a USCG-approved MSD for black and gray water handling that would comply with applicable marine and environmental regulations in force at the time of construction. Black water would be diverted to a holding tank, offloaded in port, and disposed in land-based sewage treatment plants. Since the pipelay vessel would house up to 200 personnel, it could discharge between 10,000 and 15,000 gallons (37.9 and 56.7 m^3) daily for 35 days when operating outside of State waters. Gray water generated by other construction vessels would be anticipated to be minimal because few, if any, people would be housed on those vessels. The exact composition of the gray water would be unknown and could differ daily. The barge would be moving 1.87 NM (2.2 miles or 3.5 km) per day; therefore, the discharge would be dispersed by the current over the construction corridor and not discharged in a single location. As discussed in Section 4.1.8.1, currents near the proposed site are typically northward in summer, fall, and winter; however, there is an onshore flow in spring.

Project tugs would be equipped with a USCG-approved marine sanitation device for black and gray water handling. Therefore, both black and gray water would be treated before discharged. Since up to 10 people would be housed on the vessels, the volume of the combined discharge would range from 385 to 560 gallons per day per tug. In general, this discharge would occur within the safety zone of the FSRU while the tugs are patrolling. The Project crew vessel would only be used to transport crew and material; therefore, it would generate a minimal amount of gray water. It would not be equipped with a marine sanitation device, but would have a holding tank for black water generated during its voyages. The contents of holding tanks would be offloaded at the Port of Hueneme for proper disposal.

Although some studies have indicated that gray water discharges can contain many different types of chemicals depending on the vessels, the Applicant would be obligated to adhere to all International, Federal, and State laws and regulation regarding the handling, storage, and transportation of hazardous material; therefore, no hazardous materials can be legally disposed in vessel sinks or drains.

The State of Alaska conducted studies of black and gray water discharges from large and small cruise ships to analyze the potential impacts on the water quality of the receiving water bodies. The studies indicate that wastewater discharges conducted when vessels were underway met Alaska Water Quality Standards in the receiving water due to the large dilution factor; however, stationary effluent discharge may pose some risk to the marine environment. Specifically, the studies found that wastewater discharges from large cruise ships moving a minimum of 6 knots (6.9 miles per hour or 11 km per hour) 1 mile (0.6 km) from shore would meet Alaska Water Quality Standards in the receiving water. As a result, the State of Alaska and the Federal Government instituted laws specifying cruise ship discharge limits for gray and black water in the State of Alaska and requiring that discharges be conducted no closer than 1 miles from shore and at a speed of 6 knots (6.9 miles per hour or 11 km per hour).

The State of Alaska further investigated the potential impacts of gray and black water from small cruise ships that could carry between 49 and 200 passengers. This size vessel would be expected to have discharges closer to that of a Project construction vessel. The Alaska Department of Environmental Conservation concluded that the level of toxicity from small cruise ships discharges did not present a concern when underway (6 knots): however, graywater would, in all likelihood, cause marine toxicity during stationary discharge (ADEC 2004).

The Alaska studies were conducted for large and small cruise ships that travel in the Inside Passage, the results and models are not directly applicable to conditions in the open ocean off of the California coast. However, impacts from project construction vessels would be temporary under most conditions and would be unlikely to have any long term adverse effect on water quality.

The location of discharge ports on the construction and Project vessels is unknown because the specific vessels have not been selected. In general, however, vessel discharges originate from a vessel's main machinery (such as oil treatment equipment), from human wastes (black water) and from general service (gray water). In nearly all instances, discharges exit from the amidships to the after part of the vessel below the main deck—normally the lowest deck with open areas. For large deepwater draft vessels (over 1,600 gross tons), discharges of treated water—when permitted—originate from treatment equipment located in engineering spaces and go through piping with valves to an access port or a through-hull fitting opening. A discharge port or opening can be either in the bottom plate or on the side shell below the waterline but may occasionally be exposed above the waterline, depending on the trim of the vessel (whether it is unloaded or loaded with cargo or ballast). All overboard discharge ports must be equipped with valves for closure when not in use and to prevent inadvertent or uncontrolled discharges. Tugboats have a similar layout on a smaller scale.

The time, type, amount, and location (latitude and longitude) of the discharge must be made in a discharge logbook, for example, in an oil record book for water scrubbed by an oil/water separator.

Marine Paint

The hulls of marine vessels are typically coated with a paint containing a biocide to prevent the growth of algae and the adherence of marine organisms such as barnacles. The International Convention of the Control of Harmful Anti-fouling Systems on Ships has been promulgated but has not yet been ratified (although it is expected to be ratified in 2008). At that time, Annex I of the Convention will include the following restrictions and requirements for vessels, including FSRUs, in excess of 400 gross tons:

- Vessels shall not bear anti-fouling/biocide compounds on their hulls or external parts or surfaces; or
- Shall bear a coating that forms a barrier to such compounds leaching from the underlying non-compliant anti-fouling system.

The Convention is expected to be ratified by the time that the Project is estimated to begin construction (see Table 4.18-8 above); therefore, all new Project vessels would be required to comply with the stipulations of the Convention.

Summary

In summary, during normal operations on the FSRU, the discharges identified above would be regulated by an NPDES permit and would be in the acceptable range of the permit requirements. Although unlikely, the FSRU could accidentally release gray water or contaminated deck drainage before it is treated adequately to meet water quality standards and the conditions of the NPDES permit. In addition, accidental spills of materials used on the FSRU could occur. However, pursuant to the Facility Oil Pollution Contingency Plan, any release would be reported to the regulatory agencies and immediately cleaned up.

Potential impacts on the marine environment from the discharges described above are discussed in Section 4.7, "Biological Resources – Marine."

Compliance with required prevention and response measures, such as a Facility Response Plan for the FSRU, the SWPPP, and the NPDES permit, would ensure that the potential for degradation of water quality would be reduced and that the impacts of potentially hazardous materials and oil spills would be similarly reduced. This impact is considered potentially adverse but would be below the level of its significance criteria; therefore, no mitigation would be required.

Impact WAT-5b: Degradation of Water Quality due to an Accidental Release of Diesel Fuel from the FSRU, Pipelaying Vessel, or Service Vessels

An accidental release of diesel fuel to marine waters would violate Federal and State water quality standards or objectives (CEQA Class I; NEPA moderate adverse, short-term).

The FSRU would store up to 264,000 gallons (1,000 m^3) of diesel fuel (that would be loaded prior to its departure from the shipyard to its proposed location) for the electrical generators and a natural gas odorant, both of which would be stored in USDOT-approved containers within secondary containment. The Applicant has prepared a Vessel Oil Pollution Contingency Plan to establish procedures for handling a range of possible oil pollution emergencies during pipelaying operations and a Facility Oil

Pollution Contingency Plan for oil, natural gas, and other hazardous material releases during operation of the FSRU (BHPB 2004a and 2004b). These documents discuss prevention measures, offsite consequence analysis, resources at risk, on-water containment and recovery, on-water response equipment and services, spill response personnel, on-water response and recovery strategies, shoreline protection and cleanup, response organization, notification procedures, oiled wildlife care requirements, and oil spill response training and drills.

The Facility Oil Pollution Contingency Plan for the FSRU identifies a worst case scenario in which the entire contents of the diesel fuel storage tank (264,000 gallons or 1,000 m^3) is accidentally released into the ocean over a one-hour period under adverse weather conditions with no cleanup response. Under this scenario, the trajectory analyses show that oil could reach the coastline on the mainland from Carpenteria south to Point Fermin near San Pedro after approximately 72 hours, and under Santa Ana wind conditions, the shorelines of Anacapa, Santa Cruz, and Santa Rosa Islands. The spill analysis concludes that if the appropriate and effective use of oil spill response equipment, as outlined in the USCG-approved Facility Response Plan, is implemented, it is unlikely that oil would reach the shore.

If there were an accidental release of diesel fuel, it would be more likely to occur during the replenishment of the FSRU's diesel supply when supply vessels transfer approximately 350-gallon (1.3 m^3) capacity containers to the FSRU. If a container's integrity were damaged during the transfer and a portion or all of its total volume were released, the volume of such release would be relatively small, and its release would activate the Facility Oil Pollution Contingency Plan.

The Vessel Oil Pollution Contingency Plan for the pipelaying vessel identifies a worst case scenario in which a vessel carrying 1,500 m^3 (396,258 gallons) of fuel loses 25 percent (375 m^3 or 99,065 gallons) of its fuel. The trajectory analyses for the 72-hour spill scenario estimates four cases with variable currents and wind directions, in which there is no oil spill response (containment or skimming). The trajectory analyses show potential for oiling coastline on the mainland from approximately Isla Vista and Santa Barbara south to Point Fermin near Los Angeles Harbor. A case with a westerly current presents potential for oiling the shorelines of Anacapa and Santa Cruz Islands. A case with reinforcing wind and currents to the west also presents the potential for oiling the shorelines of Santa Rosa and San Miguel Islands. Due to the lack of southerly flowing offshore currents, the spill analysis shows no trajectories that could transport oil to Santa Catalina or Santa Barbara Islands. When oil spill response with available oil skimming capacity is considered, the extent of shoreline that could be oiled is significantly reduced (BHPB 2004b).

The pipelaying vessel, because of its relatively stationary exposure during pipeline installation, would be unable to avoid a collision with another vessel, which could result in a breach of its fuel tank and a release of diesel fuel to the marine environment. The risk of collisions has been addressed through procedures described in Impact MT-1 in Section 4.3, "Marine Traffic," and concludes that the mitigation measures identified would decrease marine traffic congestion, thereby reducing the risk of vessel collision, to a level below its significance criteria. Nonetheless, any release of diesel fuel would activate the Vessel Oil Pollution Contingency Plan.

The LNG carriers could operate on diesel or natural gas, but would be powered by natural gas in California Coastal Waters, thereby minimizing impacts on the marine environment from atmospheric deposition of pollutants from emissions from these vessels. If an LNG carrier were to release diesel or any hazardous substance, the vessel-specific shipboard oil pollution plan would be implemented.

Project support vessels would be powered by diesel.

Even with the implementation of the Facility Oil Pollution Contingency Plan for the FSRU or the Vessel Oil Pollution Contingency Plan for the pipelaying vessel, impacts on water quality from an accidental release of diesel fuel would remain significant.

Impact WAT-6: Temporary Degradation of Surface Water Quality During Maintenance Activities

Releases of petroleum or other contaminants during maintenance activities could temporarily degrade surface water quality (CEQA Class III; NEPA moderate adverse, short-term).

The California Public Utilities Commission and the USDOT require periodic manual inspections and leak surveys of natural gas pipelines annually and internal inspection, i.e., pigging, every seven to ten years. Manual inspections and leak surveys would not cause a release of petroleum or other contaminants. Where internal inspection or maintenance/repair activities have the potential to impact regulated resources, such as air, surface water, listed species, or habitats, the Applicant or its designated representative would acquire individual project permits as required prior to commencing work. Repair and maintenance work would be conducted using the same AMs and BMPs as were used during construction, including BMP 2-01 through 2-09, “Waste Management and Material Controls,” and BMP 3-01 through 3-09, “Non-Storm Water Discharge Controls” (Sempra 2002). The Applicant or its designated representative has incorporated the following into the Project:

AM WAT-6a. **Best Management Practices at Creek Crossings.** Best management practices would be employed at all creek crossings for major maintenance activities that could result in spills that could enter surface water pathways.

AM WAT-6b. **Spill Response Plan.** The Applicant or its designated representative would prepare a spill response plan to protect surface water at and near the surface water crossings. This plan would be incorporated into the SWPPP as a requirement of the construction storm water NPDES permit and the SPCC Plan. The plan would identify specific measures to prevent, contain, and clean up any spills that could enter surface water pathways.

Using BMPs and implementing the spill response plan would minimize the potential for an accidental release of petroleum or other contaminants, and if such a release did occur it would be reported to the appropriate regulatory agencies and as much of the spilled material as feasible would be removed. With implementation of AM WAT-6a and AM WAT-6b, this impact would be below its significance criteria and no mitigation is necessary.

Impact WAT-7: Degradation of Surface Water Quality due to Erosion Caused by Regular Maintenance Activities

Regular maintenance of the pipelines could cause erosion and sedimentation of creeks from the use of maintenance vehicles or equipment, leading to short-term violations of water quality standards (CEQA Class III; NEPA minor or moderate adverse, short-term).

The Applicant or its designated representative has incorporated the following into the Project:

AM WAT-6a. **Best Management Practices at Creek Crossings** would apply to this impact.

Maintenance of the ROW may include trimming vegetation and visual inspection by vehicle. These activities would be routine but infrequent. The minor increase in vehicle and foot traffic would be negligible and accelerated erosion or sedimentation is not anticipated.

Implementation of BMPs would significantly reduce any effects resulting from maintenance activities by reducing or eliminating erosion or sedimentation.

Impact WAT-8: Degradation of Water Quality due to Operational Thermal Discharges

During approximately eight days per year, non-contact seawater cooling water would be discharged to the ocean at temperatures above ambient and could exceed the guidelines in the California Thermal Plan (CEQA Class III; NEPA minor adverse, short-term).

As discussed in the Applicant's Seawater Cooling Elimination report (see Appendix D6), the Applicant has redesigned the engine room cooling system to eliminate the intake and discharge of seawater under normal operations. The new closed-loop, tempered water cooling system would transfer all heat generated by the engine room, i.e., by generators, HVAC and freshwater maker, to two SCV water baths via plate heat exchangers. The seawater required would be 181,486 gallons (687 m^3) per hour or 4,360,000 gallons (16,504.4 m^3) per day for four days a year. Annual discharges associated with this seawater intake by the backup system would be approximately 17.4 million gallons (66,000 m^3) per year.

The closed-loop engine cooling system could operate using either both of the SCV heat exchangers simultaneously, or using only one, allowing the system to operate when one SCV is down for maintenance. At least one SCV in the closed loop system would be operational 99 percent of the time; therefore, the closed-loop cooling system would be operational for 361 days per year. Approximately four days annually, both SCVs would be down for maintenance and a backup seawater engine cooling system would be required.

In addition, for an additional four days per year, seawater would be used in the IGG system. The IGG would never operate during the same time that the backup engine cooling system is in operation. The IGG system would use 435,000 gallons (1,646 m^3) of seawater per hour or 10.4 million gallons (39,500 m^3) per day. Annual discharge would be 41.8 million gallons (158,100 m^3).

The USEPA has incorporated the requirements of Section 3B(3) of the California Thermal Plan into NPDES permits to use as a guideline for the analysis of adverse effects due to changes of temperature in a receiving water body. The California Thermal Plan requires that a discharge have no greater than a 20ºF maximum temperature differential relative to the receiving water body and 4ºF within 1,000 feet (305 m).

The Applicant performed thermal plume dispersion modeling to simulate the fate and transport of heated discharge from the backup seawater engine cooling system and the IGG seawater cooling system; the results were independently verified. Modeling was performed using the USEPA Visual Plumes model for the range of ambient seawater conditions expected in the vicinity of the deepwater port and assuming discharge temperatures of 20º F. Results showed that in all cases the plume temperature was predicted to dilute to less than 4ºF above ambient seawater temperature at distances of less than 1,000 feet (305 m) from the point of discharge (compliant with the requirements of Section 3B(4) of the California Thermal Plan). Plume temperatures diluted to less than 1ºF above ambient in distances ranging from 50 to 2,000 feet (15 to 610 m), depending upon the volume of discharge, the velocity of the ocean currents, and seawater density. Therefore, this impact would be below its significance criteria and no mitigation is necessary.

Table 4.18-9 summarizes the impacts and mitigation measures on water quality and sediments.

Table 4.18-9 Summary of Water Quality and Sediments Mitigation Measures

Impact	Mitigation Measure(s)
WAT-1: *Temporary Degradation of Offshore Water Quality due to Accidental Discharges* Accidental discharges of petroleum, contaminants, gray water, or sewage from vessels during offshore construction and installation activities could temporarily degrade offshore water quality (CEQA Class III; NEPA minor or moderate adverse, short-term).	None.

Table 4.18-9 Summary of Water Quality and Sediments Mitigation Measures

Impact	Mitigation Measure(s)
WAT-2: *Short-Term Increase in Turbidity or Accidental Unearthing of Contaminants during Offshore Construction* The installation of the FSRU and subsea pipelines could disturb seafloor sediments or release drill cuttings or fluids, causing a short-term increase in turbidity or accidental unearthing of contaminants (CEQA Class III; NEPA minor or moderate adverse, short-term).	None.
WAT-3: *Short-Term Degradation of Surface Water or Groundwater Quality due to Accidental Release of Drilling Fluids* Accidental releases of drilling fluids at the shore crossing during construction could degrade surface water or groundwater quality for the short term (CEQA Class II; NEPA minor or moderate adverse, short-term).	**MM WAT-3a. Drilling Fluid Release Monitoring Plan.** The Applicant shall implement its Drilling Fluid Release Monitoring Plan to minimize the potential for releases of drilling fluids, to properly clean up drilling fluids in the event of a release, and notify appropriate agencies should a release occur. The plan (see Appendix D1) would incorporate best management practices to reduce the impacts from releases of drilling fluids, including the following: • Maintaining containment equipment for drilling fluids on site; • Adding a non-toxic color dye to the drilling fluids to easily and quickly detect release of drilling fluids; • Ensuring that a qualified environmental monitor or suitably trained water quality specialist is on site full time near sensitive habitat areas during horizontal directional boring activities; • Stopping work immediately if there is any detection of bentonite seeps into surface water or sensitive habitats, for example, by a loss in pressure or visual observation of changes in turbidity or surface sheen; • Reporting all bentonite seeps into waters of the State or sensitive habitat immediately to the Project's resource coordinator, the CSLC, the Los Angeles RWQCB, and the appropriate resource agencies: National Oceanic and Atmospheric Administration Fisheries, U.S. Fish and Wildlife Service, the U.S Army Corps of Engineers, the California Department of Water Resources, the California Reclamation Board, the applicable city (Oxnard or Santa Clarita) and county (Ventura or Los Angeles); and • Cleaning up and properly disposing of any release of drilling fluids to the satisfaction of regulatory agencies.
WAT-4: *Short-Term Increase in Erosion due to Construction Activities* Boring and trenching at stream crossings, including release of hydrostatic test water, could cause short-term increases in erosion (CEQA Class II; NEPA	**AM TerrBio-1a. Erosion Control.** **MM WAT-4a. Strategic Location for Drilling Fluids and Cuttings Pit.** The Applicant or its designated representative shall ensure that a pit has been excavated at the exit hole to collect and contain the drilling fluids and cuttings. Engineering controls

Table 4.18-9 Summary of Water Quality and Sediments Mitigation Measures

Impact	Mitigation Measure(s)
minor adverse, short-term).	shall be installed to ensure that fluids remain contained in the pit, including: • Locating the entry pit and exit pit sufficiently far from a stream bank and at a sufficient elevation to avoid inundation by the stream and to minimize excessive migration of groundwater into the entry pit or exit pit; • Isolating the entry pit and exit pit with silt fencing to avoid sediment transport into the surface water body; • Isolating the spoils storage from the excavation of the entry pit using silt fencing to avoid sediment transport; • Undertaking and completing proper disposal of excess spoils; backfilling and restoring the original contour of the entry pit and exit pit; and revegetating the area upon completion of the bore; • Monitoring the drilling fluid, if a release of drilling fluids occurs, by a qualified environmental monitor or suitably trained water quality specialist to determine the appropriate cleanup response; and • Consulting with regulatory agencies to determine the next appropriate step to clean up the area. **MM WAT-4b. Transport Sediment Spoils Off-Site.** Sediment spoils that are not utilized to backfill trenches in stream channels shall be transported and disposed of offsite at an approved facility. **MM WAT-4c. Monitor Stream Crossing Construction.** A qualified environmental monitor or suitably trained water quality specialist shall be present at each stream crossing construction site to ensure compliance with applicable permits and mitigation. **MM GEO-1b. Backfilling, Compaction, and Grading** (see Section 4.11, "Geologic Resources and Hazards").
WAT-5a. *Degradation of Water Quality due to Accidental Release of Untreated Gray Water, Deck Drainage, and other Discharges that do not Meet Water Quality Standards* The FSRU or other Project vessels could accidentally release small amounts of contaminants, including bilge water, detergents, or human waste, to marine waters in excess of water quality standards (CEQA Class III; NEPA moderate adverse, short-term).	None.

Table 4.18-9 Summary of Water Quality and Sediments Mitigation Measures

Impact	Mitigation Measure(s)
WAT-5b. *Degradation of Water Quality due to an Accidental Release of Diesel Fuel from the FSRU, Pipelaying Vessel, or Service Vessels* An accidental release of diesel fuel to marine waters would violate Federal and State water quality standards or objectives (CEQA Class I; NEPA moderate adverse, short-term).	None.
WAT-6: *Temporary Degradation of Surface Water Quality During Maintenance Activities* Releases of petroleum or other contaminants during onshore pipeline maintenance activities could temporarily degrade surface water quality (CEQA Class III; NEPA moderate adverse, short-term).	**AM WAT-6a. Best Management Practices at Creek Crossings.** Best management practices would be employed at all creek crossings for major maintenance activities that could result in spills that could enter surface water pathways. **AM WAT-6b. Spill Response Plan.** The Applicant or its designated representative would prepare a spill response plan to protect surface water at and near the surface water crossings. This plan would be incorporated into the SWPPP as a requirement of the construction storm water NPDES permit and the SPCC Plan. The plan would identify specific measures to prevent, contain, and clean up any spills that could enter surface water pathways.
WAT-7: *Degradation of Surface Water Quality due to Erosion Caused by Regular Maintenance Activities* Regular maintenance of the pipelines could cause erosion and sedimentation of creeks from the use of maintenance vehicles or equipment, leading to short-term violations of water quality standards (CEQA Class III; NEPA minor or moderate adverse, short-term).	**AM WAT-6a. Best Management Practices at Creek Crossings.**
WAT-8: *Degradation of Water Quality due to Operational Thermal Discharges* During eight days per year, non-contact seawater cooling water would be discharged to the ocean at temperatures above ambient and could exceed the guidelines in the California Thermal Plan (CEQA Class III; NEPA minor adverse, short-term).	None.

4.18.5 Alternatives

4.18.5.1 No Action Alternative

As explained in greater detail in Section 3.4.1, under the No Action Alternative, MARAD would deny the license for the Cabrillo Port Project, the Governor of California would disapprove the Project under the provisions of the DWPA, or the CSLC would deny the application for the proposed lease of State tide and submerged lands for a pipeline right-of-way. The No Action Alternative means that the Project would not go forward and the FSRU, associated subsea pipelines, and onshore pipelines and related facilities would not be installed. Accordingly, none of the potential environmental impacts on water quality and sediments identified for the construction and operation of the proposed Project would occur.

Specifically, potential impacts that would not occur if the No Action Alternative is implemented include the following:

- Accidental discharges of petroleum, contaminants, gray water, or sewage;
- Disturbance of seafloor sediments or release drill cuttings or fluids, causing a short-term increase in turbidity or accidental unearthing of contaminants;
- Accidental releases of drilling fluids;
- Short-term increases in erosion;
- Accidental release of diesel fuel to marine waters would violate Federal and State water quality standards;
- Erosion and sedimentation of creeks from the use of maintenance vehicles or equipment, leading to short-term violations of water quality standards; and
- Discharge non-contact seawater cooling water at temperatures that could exceed the guidelines in the California Thermal Plan.

Since the proposed Project is privately funded, it is unknown whether the Applicant would proceed with another energy project in California; however, should the No Action Alternative be selected, the energy needs identified in Section 1.2, "Project Purpose, Need and Objectives," would likely be addressed through other means, such as through other LNG or natural gas-related pipeline projects. Such proposed projects may result in potential environmental impacts on water quality and sediments in the nature and magnitude of the proposed Project as well as impacts particular to their respective configurations and operations of each project; however, such impacts cannot be predicted with any certainty at this time.

4.18.5.2 Alternative Deepwater Port Location – Santa Barbara Channel/Mandalay Shore Crossing/Gonzales Road Pipeline

The offshore part of this alternative would include components identical to those of the proposed Project; therefore, impacts during construction and operation would be similar to those of the proposed Project. The impacts for this alternative would be the same as those for the proposed Project, and the same mitigation would apply.

4.18.5.3 Alternative Onshore Pipeline Routes

Center Road Pipeline Alternative 1

Table 4.18-5 above identifies surface water that would be parallel to or crossed by the Center Road Pipeline route and the Alternatives. Impacts along Center Road Pipeline Alternative 1 would be similar to those of the proposed Project route, and impacts for this Alternative would be the same as those for the proposed Project, and the same mitigation would apply.

Center Road Pipeline Alternative 2

Impacts along Center Road Pipeline Alternative 2 would be similar to those of the proposed Project route, and impacts for this Alternative would be the same as those for the proposed Project, and the same mitigation would apply.

Center Road Pipeline Alternative 3

Impacts along Center Road Pipeline Alternative 3 would be similar to those of the proposed Project route, and impacts and mitigation for this Alternative would be the same as those for the proposed Project.

Line 225 Pipeline Loop Alternative

The Line 225 Pipeline Loop Alternative would have impacts similar to those of the proposed Line 225 Pipeline Loop route, and impacts for this Alternative would be the same as those for the proposed Project. As identified in Table 4.18-6 above, this alternative would cross the South Fork Santa Clara River at MP 3.7 and the Santa Clara River at MP 5.7.

The Applicant's or designated representative's options to install the pipeline across the river include the use of an existing bridge or HDD (see Section 2.6.1, "Shore Crossing via HDB," for discussion of HDB vs. HDD technology). The release of drilling fluids could occur during HDD activities as a result of "frac-outs," i.e., the fluids could escape through cracks and fissures in the surrounding media because of the high pressures used. (See Sections 2.6.1, "Shore Crossing via HDB," and 2.7.2.1, "Watercourse Crossings," for more detail on HDB and HDD operations.)

If feasible, the pipeline bridge would result in the fewest impacts on water quality. Impacts from HDD would be similar to those of the proposed Project and are addressed under Impact WAT-4.

4.18.5.4 Alternative Shore Crossing/Pipeline Route

Arnold Road Shore Crossing/Arnold Road Pipeline

Impacts for the Arnold Road Shore Crossing/Arnold Road Pipeline Alternative would be similar to those for the proposed Project, and the same Applicant measures and mitigation measures would apply. Minor water bodies and agricultural drainages along the pipeline route would be crossed using the same trenching or spanning techniques as described for the proposed Project. A canal parallel to the shoreline would be crossed by trenching. HDB would be employed to install the pipeline across the beach, which would reduce or eliminate impacts from cutting, clearing, and/or removing vegetation.

Point Mugu Shore Crossing/Casper Road Pipeline

Impacts for the Point Mugu Shore Crossing/Casper Road Pipeline Alternative would be similar to those of the proposed Project, and the same Applicant measures and mitigation measures would apply. Table 4.18-5 above identifies surface water bodies along the Center Road Pipeline route and alternatives. Minor water bodies and agricultural drainages along the pipeline route would be crossed using trenching or spanning techniques, as described for the proposed Project. The onshore HDB would cross beneath a canal parallel to the shoreline and within the Naval Base Ventura County (NBVC). HDB would be employed to install the pipeline across the beach, which would reduce or eliminate impacts from cutting, clearing, and/or removal of vegetation.

Impacts would be similar to those of the Arnold Road shore crossing because the shore crossing would cross essentially the same area. However, the proposed metering station would be located in an agricultural field at the southern end of Casper Road. In addition, the total length of the HDB would be longer than the Arnold Road shore crossing, which would create additional potential for an impact on freshwater/brackish wetlands, beaches and dunes, and non-tidal salt marshes if a release of drilling fluids were to occur.

The Navy has stipulated that no wastewater of any kind would be discharged to the NBVC storm drains or sanitary sewers. All wastewater must be contained and disposed of properly and all requests to dispose of industrial wastewater must be coordinated with the U.S. Navy Water Program Manager. In addition, the Applicant or its representative must adhere to construction site runoff control and post-construction runoff controls per Phase II NPDES Rule (King 2006).

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